# DT-6X60

# Embedded Network Processor Platform

# User's Manual

## RELEASE.VERSION 2.0

379 Campus Drive, Suite 100
Somerset, NJ 08873
fax: 732 667-1091
phone: 732 667-1080
email: sales@datatekcorp.com
http://www.datatekcorp.com

Datatek APPLICATIONS, INC

# TABLE OF CONTENTS

TABLE OF CONTENTS ..... 2
TABLE OF FIGURES AND TABLES ..... 5
Important Safety Instructions ..... 6
1 Introduction ..... 7
1.1 Multiple Application Support ..... 8
1.2 High Availability Option ..... 9
2 Physical Description ..... 10
2.1 Power Interfaces ..... 10
2.1.1 48 V DC Power ..... 10
2.1.2 24 V DC Power ..... 10
2.1.3 AC Power ..... 10
2.1.4 Power Over Ethernet ..... 10
2.2 Alarms ..... 10
2.3 Console ..... 10
2.4 10/100 Base-T LAN ..... 11
2.5 LEDs ..... 11
3 Installation ..... 12
3.1 Required Equipment ..... 12
3.1.1 For Both Rack-Mount and Stand-Alone Installations ..... 12
3.1.2 For Rack-Mount Installations Only: ..... 12
3.2 Installation for AC Operation ..... 12
3.3 Installation for DC Operation ..... 13
3.4 Installation for Power Over Ethernet (POE) Operation ..... 13
4 Cabling ..... 15
4.1 Serial Console Connection and Configuration ..... 15
4.1.1 Cabling the DT-6X60 Serial Console ..... 15
4.1.2 Console Configuration Notes For BNS-2000/BNS-2000 VCS Networks ..... 16
4.2 Data Connections - LAN Port ..... 16
5 Quick-Start Configuration Guide ..... 17
5.1 Platform Configuration ..... 17
5.2 Platform Software Registration ..... 17
5.3 Application Installation ..... 17
5.4 Application Software Registration ..... 18
5.5 Assignment of an Application to an Instance ..... 18
6 DT-6X60 Command Reference ..... 19
6.1 Input Conventions ..... 19
6.2 Command Overview ..... 20
6.3 System Platform Configuration – Non IP Network Commands ..... 22
6.3.1 System Console User Help - help ..... 22
6.3.2 Login ..... 22
6.3.3 Logout ..... 22

6.3.4 System Label Configuration - label ..... 22
6.3.5 Configure the Banner - banner ..... 22
6.3.6 Date and Timezone ..... 23
6.3.7 Change Password - chgpass ..... 24
6.3.8 Reset Password - rstpass ..... 24
6.3.9 Set Console Timeout - timeout ..... 24
6.4 System Platform Configuration – IP Network Related Commands ..... 25
6.4.1 Closed User Groups - cug ..... 25
6.4.2 Console ..... 25
6.4.3 IP Address(es) – ipaddr, submask, ipother, ippublic ..... 25
6.4.4 Gateway ..... 26
6.4.5 Hostname ..... 26
6.4.6 Configure Host Names - hosts ..... 27
6.4.7 Configure Domain Name Server - dns ..... 27
6.4.8 Configure Ethernet Interface – phy ..... 27
6.4.9 Manage List of Companion DT Products – dtproduct, vfy dtproduct ..... 28
6.5 Software Administration Commands ..... 29
6.5.1 Installing a Platform Upgrade - install ..... 29
6.5.2 Platform Software Registration - register ..... 29
6.5.3 Install an Application - install ..... 29
6.5.4 Application Software Registration - regapp ..... 30
6.5.5 Application Assignment to Instance(s) - app ..... 30
6.5.6 Reset An Application Password - rstapp ..... 30
6.5.7 Uninstall an Application - uninstall ..... 31
6.5.8 Backup and Retrieve Application Configuration Data – back, retr (reload) ..... 31
6.5.8.1 DT6backup and DT6reload Utilities ..... 32
6.6 Reinitializing The DT-6X60 - reboot ..... 32
6.7 SNMP Configuration - snmp ..... 32
6.8 Run-Time Commands ..... 34
6.8.1 Display Connections – dc or dconn ..... 34
6.8.2 Display Measurements – dm or dmeas ..... 35
6.8.3 Diag Command - diag ..... 35
6.8.3.1 Address – diag addr ..... 35
6.8.3.2 CPU – diag cpu ..... 35
6.8.3.3 Device – diag dev ..... 36
6.8.3.4 Kill Console – diag killcon ..... 37
6.8.3.5 Ping – diag ping ..... 37
6.8.3.6 Trace Route - diag tracert or diag trte ..... 38
6.8.4 Ping ..... 38
6.8.5 Remove or Restore An Instance – remove, rem, rm, restore, res, or rs ..... 38
6.8.6 Restart An Instance - restart ..... 38
6.8.7 Trace Route – trte or tracert ..... 38
6.8.8 Verify Configuration Settings - vfy ..... 39
6.8.8.1 Verify Running Applications – vfy app or vfyapp ..... 39
6.8.8.2 Verify Configured Application Instances – vfy cfg or vfycfg ..... 39
6.8.8.3 Verify Module – vfy mod or vfymod ..... 40
6.9 High Availability Option ..... 41
6.9.1 Module Configuration for High Availability – ippublic, ipother ..... 42
6.9.2 Application Installation and Operational Configuration ..... 42
6.9.2.1 Application Installation - stbyupd ..... 42
6.9.2.2 Operational Configuration – stbyupd cfg ..... 43
6.9.3 Automatic Standby Configuration Update – stby cfg ..... 43

6.9.4 Standby Logs – stby dlog, stby reset ....44
6.9.5 Switchover ....44
6.9.6 Commands Not Available in *Standby* Mode ....44
7 APPENDIX A: Console Cable- Special Wiring Diagrams ....46
7.1 The DB9 Console Adapter ....47
8 APPENDIX B: SNMP MIB Variable Database and Traps ....48
8.1 SNMP MIB Variable Database ....48
8.2 Supported Traps ....50
9 APPENDIX C: TCP/UDP Port Numbers ....51
10 APPENDIX D: The Display Measurements (dm) Report ....52
10.1 IP - dm ip ....52
10.2 TCP – dm tcp ....54
10.3 UDP – dm udp ....56
10.4 ICMP – dm icmp ....57
10.5 ETH – dm eth ....59
11 APPENDIX E: Brief Descriptions of DT-6XXX Applications ....60
11.1 IP-BHI ....60
11.2 TN3270 ....60
11.3 IP-B2APRT ....60
11.4 IP-E2A ....60
11.5 IP-FANOUT ....60
11.6 IP-LTCN ....60
11.7 X25PAD ....61
11.8 IP-SLM ....61
11.9 IP-SPOOL ....62
11.10 IP-VCON ....62
11.11 MULTIMATE ....62
11.12 ONSITE ....63
12 APPENDIX F: DT-6X60 Specifications ....64
12.1 Console Port ....64
12.2 10/100 LAN Port ....64
12.3 Physical Dimensions ....64
12.4 Environmental Operating Range ....64
12.5 Regulatory Information ....64
12.6 Power Requirements ....65
13 Hardware Warranty ....66
14 End-User License Agreement for Software ....66
14.1 Software License ....66
14.2 Intellectual Property Rights ....66
14.3 Software Support ....67
14.4 Export Restrictions ....67
14.5 Limited Warranty ....67
14.6 No Other Warranties ....67

14.7 Special Provisions ..... 67
15 Limitation of Liability ..... 68

# TABLE OF FIGURES AND TABLES

Figure 1: Typical DT-6X60 Deployment ..... 7
Figure 2: DT-6X60 Front View ..... 10
Figure 3: DT-6X60 Front View ..... 12
Figure 4: Console Cabling Options ..... 15
Figure 5: Console Cable Pin Assigment ..... 46
Figure 6: Special Wiring for Modular Cable ..... 46
Figure 7: 9-Pin Console Adapter Wiring Diagram ..... 47

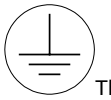
Table 1: DT-6XXX Applications ..... 8
Table 2: Faceplate LEDS ..... 11
Table 3: Console Cable Order Codes ..... 15
Table 4: Category 5 Cable Ordering Information ..... 16
Table 5: Command Reference table ..... 21
Table 6: SNMP Commands and Action ..... 48
Table 7: SNMP MIB-II Variables ..... 48
Table 8: Supported SNMP Traps ..... 50
Table 9: TCP/UDP Port Numbers Used ..... 51
Table 10: Environmental Operating Ranges ..... 64
Table 11: Regulatory Information ..... 64
Table 12: Power Requirements ..... 65

# IMPORTANT SAFETY INSTRUCTIONS

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

When installing, operating, or maintaining this equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock, and injury to persons, including the following:

- ❑ Read and understand all instructions.
- ❑ Follow all warnings and instructions marked on this product.
- ❑ For information on proper mounting instructions, consult the User's Manual provided with this product.
- ❑ The telecommunications interface should not leave the building premises unless connected to telecommunication devices providing primary and secondary protection.
- ❑ This product should only be operated from the type of power source indicated in the User's Manual.
- ❑ This unit must be powered from either –48 V DC or AC voltage sources. See User's Manual before connecting to the power source.
- ❑ The –48 V DC input terminals are only provided for installations in Restricted Access Areas locations.
- ❑ Do not use this product near water, for example, in a wet basement.
- ❑ Never touch non-insulated wiring or terminals carrying direct current or leave this wiring exposed. Protect and tape wiring and terminals to avoid risk of fire, electric shock, and injury to service personnel.
- ❑ To reduce the risk of electrical shock, do not disassemble this product. Only trained personnel should perform servicing. Opening or removing covers and/or circuit boards may expose you to dangerous voltages or other risks. Incorrect re-assembly can cause electric shock when the unit is subsequently used.
- ❑ For a unit intended to be powered from –48 V DC voltage sources, read and understand the following:
    - This equipment must be provided with a readily accessible disconnect device as part of the building installation.
    - Ensure that there is no exposed wire when the input power cables are connected to the unit.
    - Installation must include an independent frame ground drop to building ground. Refer to User's Manual



This symbol is marked on the DT-6X60, adjacent to the ground (earth) area for the connection of the ground (earth) conductor.

    - This Equipment is to be Installed Only in Restricted Access Areas on Business and Customer Premises Applications in Accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA No. 70. Other Installations Exempt from the Enforcement of the National Electrical Code May Be Engineered According to the Accepted Practices of the Local Telecommunications Utility.
- ❑ For a unit equipped with an AC Wall Plug-In Unit, read and understand the following:
    - The unit was tested with the Phi Hong Model PSA-30U-240 Wall Plug-In Unit. (11-240 V AC to 24 V DC).
    - Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
    - Do not staple or otherwise attach the power supply cord to the building surfaces.
    - Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.
    - The socket outlet shall be installed near the equipment and shall be readily accessible.
    - The Wall Plug-In unit may be equipped with a three-wire grounding type plug, a plug having a third (grounding) pin. This plug is intended to fit only into a grounding type power outlet. Do not defeat the safety purpose of the grounding type plug.
    - Do not allow anything to rest on the power cord. Do not locate this product where persons walking on it may abuse the cord.
    - Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
        a) When the power supply cord or plug is damaged or frayed.
        b) If liquid has been spilled into the product.
        c) If the product has been exposed to rain or water.
        d) If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by qualified technician to restore the product to normal operation...
        e) If the product has been dropped or the cabinet has been damaged.
        f) If the product exhibits a distinct change in performance.

## Save These Instructions

# 1 INTRODUCTION

Two products are covered in this User Manual: the DT-6160 and the DT-6260 Embedded Network Processors (ENP's). Generically, these will be referred to as DT-6x60 in the descriptions below. The name DT-6XXX is also used sometimes. This names implies that whatever is being described applies to all three platforms: the DT6061, DT-6160, and DT-6260.Only when necessary, will an actual product name be used. These products have many similarities with DT-6061, but have different power options and capabilities. When systems are duplexed, the same product must be used for both the active and standby processors.

The DT-6X60 is a network applications computer that applies customer specific protocol operations *(protocol translation and termination)* of network connections that require such a function in a distributed network.

The DT-6X60 supports a multitude of applications, and may support combinations of these applications simultaneously. The elements common to all applications are provided by the DT-6X60 hardware and operating environment. In addition, the DT-6X60 has an SNMP agent that is completely independent of any application.

The basic configuration for the DT-6X60 may be as follows:

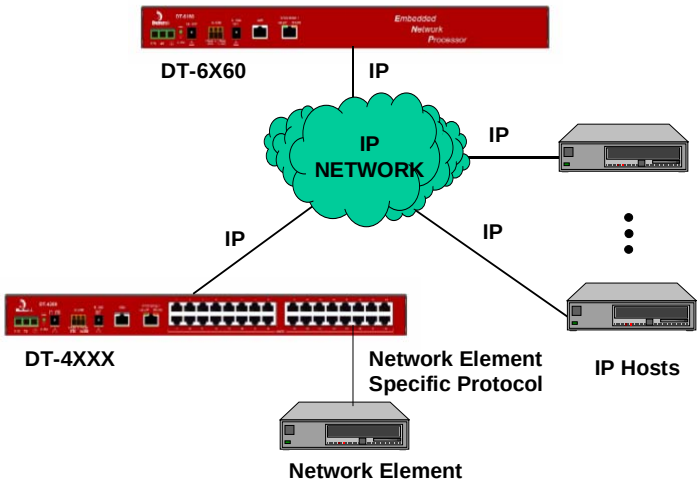



**Figure 1: Typical DT-6X60 Deployment**

In the above figure representing a generic configuration for a DT-6X60, the Network Element *(NE)* communicates with IP Hosts over an IP Network using the DT-6X60 as an intermediary for protocol conversion / termination. The NE uses its specific communications protocol to talk through a DT-4XXX or some other device(s) that will bridge the NE with an IP infrastructure. The DT-6X60 running one of its custom applications performs the necessary protocol translation or termination allowing the NE and IP-Hosts to ultimately communicate.

## 1.1 MULTIPLE APPLICATION SUPPORT

The DT-6X60 can support one or more different types of applications simultaneously and multiple **instances** of each application. An application **instance** can be described as a unit of configuration parameters as a specific DT-6X60 application defines them. In other words, each **instance** of an application is a completely separate process where all aspects of the configuration and operation of the application are performed entirely within that process. The configuration of an application is accomplished via the use of a telnet console. The DT-6160 supports 30 instances maximum, the DT-6260 48 instances.

Currently, each DT-6X60 is factory configured to order to support 1, 2, 3, 4, or 5 application types simultaneously. The table below shows the list of the currently available applications.

**Table 1: DT-6XXX Applications**

| Application Name | Description |
|---|---|
| IP-B2APRT | Allows a BiSync host to print to an ASCII printer located on an IP network. |
| IP-BHI | Allows a legacy BiSync host to connect to an IP network. |
| IP-E2A | Allows E2A telemetry ports of a network element to communicate over IP networks to OS hosts and eliminates the need for digital bridging. |
| IP-FANOUT | Allows diverse LAN segments to be connected over a WAN as a cohesive IP network. |
| IP-LTCN | Allows legacy telephone line test equipment to interface with IP-based OS hosts. |
| IP-SLM | Allows specialized (B)X.25 telephone switch interfaces and other network elements to communicate over IP networks with OS hosts. |
| IP-SPOOL | Eliminates underutilized physical printers by providing logical printers and print spooling per RFC1179 to a physical, shared print resource anywhere in an IP network |
| IP-VCON | Takes over the mundane task of monitoring a large and varied set of device consoles autonomously, collects console messages, and intervenes automatically when necessary according to user-defined scripts. |
| MULTIMATE | Eliminates the wasteful expense of external PADs and port-sharing devices. In addition, strategies for redundancy and disaster recovery are available through the judicious use of MultiMate. |
| ONSITE | Generates ASCII alarms based on network alarm grid open and closed contacts. |
| TN3270 | Allows a 3270 client on an IP network to access a BiSync host. |

| Application Name | Description |
|---|---|
| X25PAD | Eliminates the need, complexity, and expense of specialized X.25 equipment in an IP network by allowing an X.25/BX.25 device, such as a network element's OS port, to be connected to a synchronous port anywhere in the IP network and communicate with a host via IP. |

Additional description for each application is provided in Appendix E, section 11. In addition, the user manual for each application can be downloaded at no charge from the Datatek web site: http://www.datatekcorp.com/support/support_soft_firm_updates.html

## 1.2 HIGH AVAILABILITY OPTION

The DT-6X60 is available in a redundant configuration to provide high availability of the user's applications. A single *active* DT-6X60 running a set of application **instances** is coupled with a *standby* DT-6X60 that is ready to take over automatically if the *active* DT-6X60 fails for any reason. After the failed DT-6X60 recovers, it is returned to service as *standby**. Both the active and standby devices must be the same type, i.e. either both DT-6160's or both DT-6260's. They cannot be intermixed nor intermixed with DT-6061's.***

# 2 PHYSICAL DESCRIPTION

**Figure 2: DT-6X60 Front View**

## 2.1 POWER INTERFACES

### 2.1.1 48 V DC POWER

Rack-mounted or operating stand-alone, the ***DT-6X60*** accepts DC power input directly from a 48 V DC power source which connects to the three position (return, -48, and ground) terminal block labeled 48V DC on the faceplate. The terminal block connectors accommodate 10-awg (American Wire Gauge) to 14-awg wires. A strain-relief clamp is available separately for DC wire stabilization. The actual voltage range is 18 through 72 volts inclusive.

### 2.1.2 24 V DC POWER

Rack-mounted or operating stand-alone, the ***DT-6X60*** accepts DC power input directly from a 24 V DC (nominal) via a circular connector. The circular connector is labeled 24 V DC on the DT-6X60 faceplate. The actual voltage range is 18 through 72 volts inclusive.

### 2.1.3 AC POWER

For this application, a separate AC power supply is available which plugs into a standard 115/240V AC outlet. The power supply has a six-foot cable that terminates with a barrel connector. The barrel connector plugs into the circular connector labeled 24 V DC on the ***DT-6X60*** faceplate.

### 2.1.4 POWER OVER ETHERNET

The **DT-6X60** will accept power on the LAN connection using the **POE** specification. When used, no additional power is required by the **DT-6X60**.

## 2.2 ALARMS

The Alarm Grid connector is a three position (Failed Open, Closed, Failed Closed) terminal block labeled ALARM on the DT-6X60 faceplate. The terminal block connectors accommodate 10-awg to 14-awg wires.

## 2.3 CONSOLE

There are two types of consoles in a DT-6X60: the single platform console, which is accessible via a hard-wired serial connector or by telnet (to port 1023), and multiple telnet application consoles. The hard-wired serial console is used for initial configuration of the platform, and the hard-wired serial console or its telnet equivalent may be used for configuration updates and for installation and control of applications. Each application telnet console is used to configure the application database for one instance of an application.

The serial console port interface, which is labeled as CON on the DT-6XXX, requires a standard RJ45 terminated, twisted pair, data cable. It connects as data terminating equipment (DTE) to an asynchronous device and uses RS-232C signaling. Connection to the DT-6X60 console is required for initial configuration of the IP parameters for the DT-6X60 platform. Otherwise, the console can be disconnected during normal operation and only the various logical telnet consoles used to administer the platform or various instances of the applications. See section 4.1 for details on cabling the serial console. The serial console is configured as 9600 bps, 8 bits, and no parity.

## 2.4 10/100 BASE-T LAN

The LAN connection is a 10/100 Base-T interface on the front of the unit that is labeled “10/100-Base-T”. The interface requires a standard RJ45 terminated Category 5 twisted-pair data cable. It connects to a 10/100 Hub, Etherswitch, or router on a local LAN segment providing access to a wide-area IP based network. This port supports TCP/IP peer-level protocols (e.g. TELNET, TCP, IP, ARP, SNMP, etc.). The LAN interface will automatically negotiate the speed with the network interface PHY.

## 2.5 LEDS

The faceplate contains light emitting diodes (LEDs) used to report DT-6X60 activity and status:

| LED Function | LED Color | LED Description |
|---|---|---|
| PWR | Green | Unit Power Indicator |
| ALARM | Red | Reset Indicator & General Failure Indicator |
| LNK/ACT | Green | Link & Activity (Blink) Indicator |
| DPX/COL | Red | Duplex & Collision (Blink) Indicator |

**Table 2: Faceplate LEDS**

# 3 INSTALLATION

This chapter contains the steps needed to install and cable the ***DT-6X60***. A #2 Phillips and medium-sized flathead screwdrivers are required.

**Figure 3: DT-6X60 Front View**

## 3.1 REQUIRED EQUIPMENT

### 3.1.1 FOR BOTH RACK-MOUNT AND STAND-ALONE INSTALLATIONS

To install either a rack-mounted or stand-alone ***DT-6X60***, the following items are needed:

- One ***DT-6X60*** unit
- For AC operation, AC power supply
- For DC operation, a strain-relief clamp for wire stabilization
- A standard RJ45 terminated Category 5 twisted-pair data cable for the LAN port connection.
- A console cable that may require special wiring depending on the type of console used. (Console Cables – refer to CABLING section 4.1 below to determine specific requirements for this installation.)

**Note: Shielded cables must be used in order to maintain compliance with EMC requirements.**

### 3.1.2 FOR RACK-MOUNT INSTALLATIONS ONLY:

- An EIA standard 19-inch or 23-inch equipment rack with internal, vertical mounting rails. Hole spacing on the vertical-mounting rail must be 1.25 inches. Use the dimension specifications to calculate how high the rack needs to be to support the required number of ***DT-6X60*** units.
- A pair of mounting brackets for each ***DT-6X60***.
- The Environmental Operating Range of 5 to 40 degrees C (41 to 124 degrees F) is necessary to maintain compliance with UL.

## 3.2 INSTALLATION FOR AC OPERATION

1) *Stand-Alone:* Attach the provided feet to the bottom of the unit
   *Rack-Mount:* Attach the mounting brackets to each side of the ***DT-6X60***.
2) *Stand-Alone:* Place the ***DT-6X60*** in the desired location, such as a shelf in a data equipment rack.
   *Rack-Mount:* Fasten the ***DT-6X60*** to a 19-inch equipment rack (using appropriate rack screws) or use extension ears for a 23-inch rack.

3) Attach the LAN data transport cable

4) Attach console cable by plugging one end of an RJ45-terminated twisted-pair data cable into the ***DT-6X60*** console interface and the other into the port of the asynchronous device that will be used to configure or manage the ***DT-6X60***.

5) Plug the power supply into a standard 115V AC outlet and the barrel connector on the power supply cable into the circular connector on the faceplate labeled 24V DC.

## 3.3 INSTALLATION FOR DC OPERATION

1. *Stand-Alone:* Attach the provided feet to the bottom of the unit
   *Rack-Mount:* Attach the mounting brackets to each side of the ***DT-6X60***.
2. *Stand-Alone:* Fasten the strain relief to the side of the ***DT-6X60***.
   *Rack-Mount:* Fasten the strain relief to the ***DT-6X60*** rack-mount bracket.
3. *Stand-Alone:* Place the ***DT-6X60*** in the desired location, such as a shelf in a data equipment rack.
   *Rack-Mount:* Fasten the ***DT-6X60*** to a 19-inch equipment rack (using appropriate rack screws) or use extension ears for a 23-inch rack.
4. Attach the LAN transport cable.
5. Attach console cable by plugging one end of an RJ45-terminated twisted-pair data cable into the ***DT-6X60*** console interface and the other into the port of the asynchronous device that will be used to configure or manage the ***DT-6X60***.
6. Run 48V DC (return, -48, and ground) wires from a central source through the strain relief clamp for DC wire stabilization. On the ***DT-6X60*** faceplate, attach the return, -48, and ground wires to the return, -48, and ground connections, respectively, on the terminal block labeled 48V DC.
7. Rack-Mount: The Environmental Operating Range of 5 to 40 degrees C (41 to 104 degrees F) is necessary to maintain compliance with UL.

## 3.4 INSTALLATION FOR POWER OVER ETHERNET (POE) OPERATION

1. *Stand-Alone:* Attach the provided feet to the bottom of the unit.
   *Rack-Mount:* Attach the mounting brackets to each side of the ***DT-6X60***.
2. *Stand-Alone:* Place the ***DT-6X60*** in the desired location, such as a shelf in a data equipment rack.
   *Rack-Mount:* Fasten the ***DT-6X60*** to a 19-inch equipment rack (using appropriate rack screws) or use extension ears for a 23-inch rack.
3. Attach console cable by plugging one end of an RJ45-terminated twisted-pair data cable into the ***DT-6X60*** console interface and the other into the port of the asynchronous device that will be used to configure or manage the ***DT-6X60***.
4. Connect an ethernet cable to the 10-100 Base-T port and the other end to a POE Injector. The POE Injector is connected by a second ethernet cable to the local hub or router.
5. Connect the POE Injector to the output of a power supply that provides at least 200 mA at –48V DC. (This capability was tested with a HyperLink Technologies Model BT-CAT5-P1 ethernet injector using a HyperLink Technologies Model PSU15B-8 Power Supply. That supply has an input of .5 A at 100 –240 V AC and output of .31 A, 15 watt maximum at –48 V DC.)

6. Rack-Mount: The Environmental Operating Range of 5 to 40 degrees C (41 to 104 degrees F) is necessary to maintain compliance with UL.

# 4 CABLING

## 4.1 SERIAL CONSOLE CONNECTION AND CONFIGURATION

### 4.1.1 CABLING THE DT-6X60 SERIAL CONSOLE

This section describes the options for cabling the ***DT-6X60*** serial console port, to allow the ***DT-6X60*** platform to be managed by a terminal, PC, dial-up modem, or asynchronous network connection. The following diagram shows the connection options:

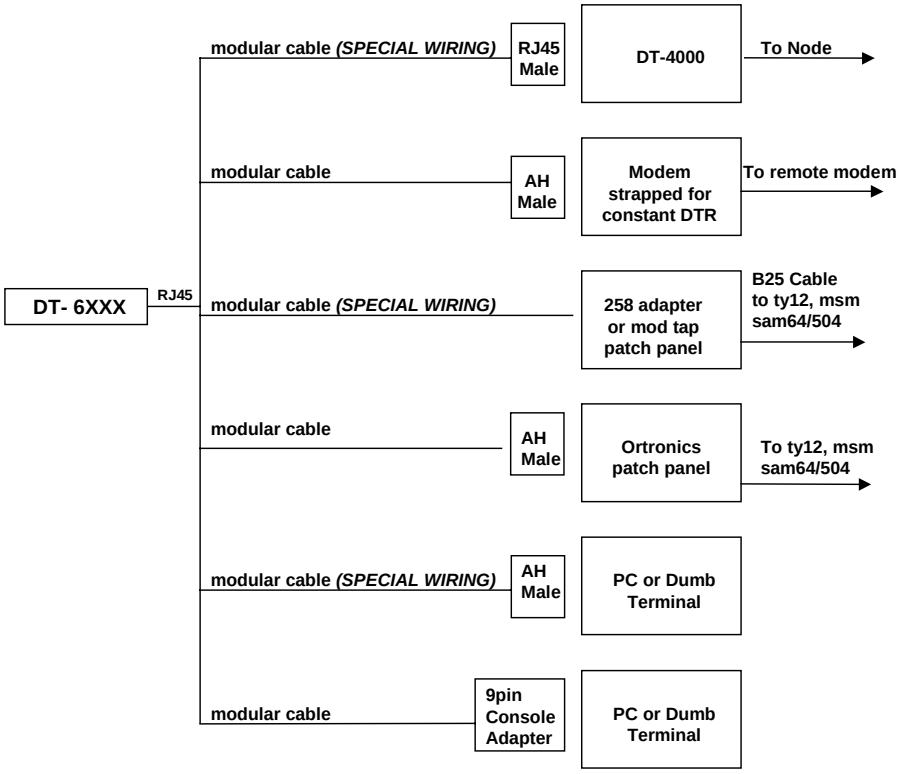



**Figure 4: Console Cabling Options**

The following cables and adapters are available for console connections:

| Cable or Adapter | Order Information (Lucent Technologies) | Order Information (CBM of America) |
|---|---|---|
| 8 pin modular to 8 pin modular cable *(standard)* | Comcode 408981653 (25') | P-10419-XX (XX ' length) |
| 8 pin modular to 8 pin modular cable *(special wiring) (25')* - The wiring schematic is shown in Appendix A. | Comcode 408198133 | DTCONCAB-25 |
| Male 25 pin to 8 pin connector *(AH Male)* | ED5P055-31 G (139) | ADPG139 |
| 258 Adapter | ED5P055-31 G (155) | ADPG155 |

**Table 3: Console Cable Order Codes**

***Important!*** A modular cable with "SPECIAL WIRING" can be ordered using the table above or built using the wiring diagrams provided in this manual in section 7. The pin-outs for the 9-pin connector is shown in section 7.1.

### 4.1.2 CONSOLE CONFIGURATION NOTES FOR BNS-2000/BNS-2000 VCS NETWORKS

- Configure SAM, TY12 and MSM console connections as 9600 bps with 8 bits and no parity, and use a DCE type cable.
- Configure SAM and MSM console connections as type "host" and as a "pap" (permanently active port).
- Configure TY12 console connections as type "console".

## 4.2 DATA CONNECTIONS - LAN PORT

The DT-6X60 is connected to the LAN through its 10/100 Base-T auto sense port. Connect a standard Category 5 twisted-pair data cable terminated with an RJ45 connector to the DT-6X60 at the port labeled LAN. Connect the other end to a 10/100 Base-T hub, etherswitch, or router on a local LAN segment that provides access to a wide-area IP-based network. Category 5 cables can be obtained through CBM of America or your local supplier.

| Cable | Order Information CBM of America |
|---|---|
| Category 5 10 Base-T | P-10596-XXX* |
| Category 5 100 Base-T | P-11754-XXX* |
| *XXX is cable length desired | |

**Table 4: Category 5 Cable Ordering Information**

# 5 QUICK-START CONFIGURATION GUIDE

There are two levels of configuring a DT-6X60: platform and application. This user manual covers only the platform configuration and registration, and the installation and registration of the application software. The commands and IP addressing associated with configuring an application in an instance are described in the corresponding User Manual for that application. Those manuals are available on the Datatek web site.

Below is a sample configuration sequence for a DT-6X60 platform. The initial Platform Configuration sequence must be entered via the hard-wired serial console connected to the CON port of the DT-6XXX. After the Platform Configuration sequence has been performed, platform console operations may be conducted either via the hard-wired serial console or by connecting from a third party host through telnet to port 1023 of the platform's configured IP address.

## 5.1 PLATFORM CONFIGURATION

The following is the command sequence for the initial configuration of the DT-6X60.

```
<DT-6X60> login passwd=initial ↲      enter "logged: in mode
User is logged in
<DT-6X60> date 11:05:00 04/22/2004 ↲enter date & time (optional)
Thu Apr 22 11:05:00 EDT 2004
<DT-6X60> ipaddr 135.17.59.240 ↲      enter IP address of DT-6X60
You must reboot for this change to take effect
<DT-6X60> submask 255.255.255.0 ↲     enter Subnet Mask of DT-6X60
You must reboot for this change to take effect
<DT-6X60> gateway 135.17.59.1 ↲       enter Gateway Address of DT-6X60 if necessary
You must reboot for this change to take effect
<DT-6X60> reboot ↲
```

## 5.2 PLATFORM SOFTWARE REGISTRATION

The software for this product must be registered in order to run applications. Please call Datatek for a registration key. The key is based on the **product code** (DT-6X60), the two-part software release number (**release.version**)[1] of the platform software, and the hardware **serial number** and **MAC address** of the DT-6X60.

```
<DT-6X60> register ↲
Product_Code=DT-6X60
MAC=0.96.29.99.99.99
HW_SERNUM=99.99.99.99.99.99
Build_Number=16.0
Build_Date="Mon Feb  2 14:21:02 EST 2004"

Enter key: rxyuvw8s
Registration successful
```

## 5.3 APPLICATION INSTALLATION

This action requires that a host, acting as an ftp server, is present on a network that is accessible by the DT-6X60 install command.

[1] Also called the **Build Number**.

```
<DT-6X60> install ↲
application or package name ? NAME=tn3270 ↲
name of ftp download server ? SRV=<server name> ↲
login on download server ? ID=<user's login> ↲
password ? PASS=<user's passwd> ↲
name of directory on server ? LOC=(/dt6X60/apps) <location of
application> ↲
Downloading "tn3270" ...
Downloaded:
-rwxrwxrwx 79701 May  5 05:21 tn3270.dt6
Testing ...
Sum of "tn3270": 34502, package type: DT-6X60C
Installing ... ............
Install of "tn3270" successful
```

## 5.4 Application Software Registration

Each application that is installed on a DT-6X60 must be registered in order for it to run. Please call Datatek for a registration key. The key is based on the **application name,** the two-part software release number (**release.version**)[2] of the application software, and the hardware **serial number** and **MAC address** of the DT-6X60. This information is readily available from the **regapp** command:

```
<DT-6X60> regapp ↲
Unregistered applications:
    tn3270: Build 12.0 "Mon Apr 19 21:53:05 EST 2004"
  MAC Address = 0.96.29.111.14.29
  Serial Number = 17.61.14.111.14.29
application registration key ? KEY=larz7w8s
Registration successful for 'tn3270'
```

## 5.5 Assignment of an Application to an Instance

```
<DT-6X60> app 1 type=tn3270 ↲        configuring instance #1 for installed application
Stopping 1 none(55)
PID 1033 running tn3270 1
```

[2] Also called the **Build** or **Build Number**.

# 6 DT-6X60 COMMAND REFERENCE

All DT-6XXX software is composed of two components. One component, called the ***Platform,*** exists to support all applications. The second component is comprised of the individual **application*(s)***.

The ***Platform*** provides Operating System functions, selected interfaces, protocol stacks, SNMP functions, and system OA&M while each **application** uses the services of the resident ***Platform***.

The ***Platform*** commands may be entered through the serial (CON) port or through a telnet connection to port 1023 at the IP address configured for the DT-6XXX unit. The two sources are merged and treated as a single console, and all console output is directed to both telnet and the serial port (except for post-shutdown and early booting messages, which appear only on the serial port). When the serial port has logged into the console and a new telnet connection is made to the platform console, the platform console is logged out so that the telnet caller does not get access to an open console. The exception is when CUGs have been defined for the console. In that case, telnet callers are screened by CUG, and the forced logout is not done.

Most commands cannot be entered without first *logging in* with a user-settable password. The only commands allowed without first logging in are:

- help
- login
- rstpass

The command set for the DT-6160 and DT-6260 is generally the same as the command set for the DT-6061with one exception: There is no need for the **PHY** command in the DT-6061 because of the physical differences between the DT-6061 and the DT-6X60's.

## 6.1 INPUT CONVENTIONS

All parameters may be given on the command line. Parameters of the form **name=<value>** may be given in any order.

For several complex commands, listed below, missing parameters, or corrections of errors in given parameters, of the form **name=<value>** are collected by prompting the console user. The user responds to a prompt for the **name** by typing the required **<value>** followed by *newline*. Defaults are supplied in some cases, so the user need only enter *newline*.

- The legal characters for command input are the upper and lower case letters, numbers, spaces, tabs, and the following special characters: **!#%+,-./:=_**.
- Commands may be entered in upper or lower case.
- Parameters of the form **name=value** may use upper or lower case for **name**.
- Default values, if any, are shown in parenthesis as part of the prompt.
- Case is preserved for values.
- Values may not contain spaces, tabs, or the **=** character.
- When a password is being requested by a prompt, input is not echoed. The legal characters for prompted passwords are the upper and lower case letters, numbers, and the following special characters: **!# $%&'*+,-./:;< >?_{|}~**.
- The **banner** and some of the parameters of the **snmp** command entered in response to prompts can use any special characters.

- **Backspace** erases one character and @ deletes the current line of input. The *del* key kills most commands.
- An optional **timeout** can be configured for the console; if a command is not completely entered within the configured timeout period (in the range of 30 to 1000 seconds), the console is automatically logged off.
- Most commands cannot be entered without first *logging in* with a user-settable password. The only commands allowed without first logging in are:
    - help
    - login
    - rstpass

## 6.2 COMMAND OVERVIEW

The totality of commands has been divided into groups according to their use. Each group appears in its own section. The list of sections with the list of commands for each section is as follows:

**Table 5: Command Reference table**

| Section Number | Category | Command List |
|---|---|---|
| **6.3** | **System Platform Configuration - Non IP Network Commands** | help<br>login<br>logout<br>label<br>banner<br>date<br>timezone<br>chgpass<br>rstpass<br>timeout |
| **6.4** | **System Platform Configuration - IP Network Commands** | cug console<br>ipaddr<br>ipother<br>ippublic<br>submask<br>gateway<br>hostname<br>hosts<br>dns phy<br>dtproduct |
| **6.5** | **Software Administration Commands** | install<br>register<br>regapp app<br>rstapp<br>uninstall<br>back<br>retrieve<br>reload |
| **6.6** | **System Reset Command** | reboot |
| **6.7** | **SNMP** | snmp |
| **6.8** | **Run-Time Commands** | dconn<br>dmeas<br>diag<br>ping<br>remove<br>restore<br>restart<br>tracert<br>vfy |
| **6.9** | **Duplex Operation** | ipother<br>ippublic<br>stbyupd<br>stby<br>switchover |

## 6.3 SYSTEM PLATFORM CONFIGURATION – NON IP NETWORK COMMANDS

### 6.3.1 SYSTEM CONSOLE USER HELP - HELP

**Syntax: help |? [command]**

The available commands on the DT-6X60 system console, along with a short narrative, is available via the **help** or "**?**" command. Command-specific help is available as well. For example, help "L" shows help for all commands that begin with "L" or help "login" shows help for this specific command.

### 6.3.2 LOGIN

**Syntax: login PASSWD=<password>**

The **login** command is used to allow access to the other commands.

The **PASSWD** parameter is not echo suppressed. However, if the **PASSWD** parameter is not provided in the command line, the console prompts for a password; the response *is* echo-suppressed in this case.

If the password is valid, the user is placed in the *logged in* mode. Once the console user is logged *in*, the balance of the commands are accessible. The **login** command is not accessible if the user is already logged in.

### 6.3.3 LOGOUT

**Syntax: logout**

The **logout** command is only allowed if the console user is logged *in*. It uses no arguments. It will set the console to the logged *out* mode. The console may also be logged out by typing ***exit*** or ***ctrl-D***.

### 6.3.4 SYSTEM LABEL CONFIGURATION - LABEL

**Syntax: label [<word> *(no spaces)* | none]**

This command enters a *label* that subsequently appears as part of the system console prompt and is used as a key for backup and retrieve directories on the backup server. The word "**none**" deletes the label. *(See **backup/retrieve**)*

### 6.3.5 CONFIGURE THE BANNER - BANNER

**Syntax: banner [edit]**

The **banner** command is only allowed if the unit is logged in.

Using the **banner** command, a banner that consists of up to 9 lines can be entered. The banner is displayed when the **login** command is executed. When the login command is entered with the password on the same line as the command, the banner is displayed after the login. If the **login** command is used in prompted mode, the banner appears before the password prompt.

When the **banner** command is executed with no parameters, the entire banner is displayed, and then the DT-6X60 administrator may re-enter an entirely new banner line-by-line or use the 'DEL' key to exit without altering the existing banner. The entire banner can also be displayed by typing **vfy banner**.

To change one or more lines of text in the banner, the administrator types **banner edit**. The entire banner is then displayed with line numbers. The user is prompted for which line to change. When the user enters a line number, the system displays the corresponding banner line and prompts for a replacement line. The user must then type in the entire text for that line followed by a newline

(enter). The user is again prompted for a line number. When finished, the user types a newline in response to the line number prompt.

The character set allowed for the banner is not restricted by the input rules of section 6.1. Any characters may be entered for the banner. The @, ****, and *backspace* characters may be entered only by preceding them with ****.

### 6.3.6 DATE AND TIMEZONE

```
Syntax: date [hh:mm:ss] [mm/dd/yyyy]
        timezone NAME=<timezone> START=<start time> STOP=<stop time>
        timezone help
```

The **date** command sets the system date and time. Without arguments the date command displays the current date & time settings. Since the DT-6X60 does not have a battery backed-up timing device, it may lose time across system reboots.

The **timezone** command configures the parameters for the user's time zone, for proper display of the date and time. It is intended that time be kept internally according to "Universal Time" (formerly known as Greenwich Mean Time). The time zone should be administered so that the **date** command and all reports that might print dates (e.g. timestamps on files) can display local time while the system uses Universal Time. The **help** option of **timezone** prints a description of how to set the timezone (similar to the following).

The **NAME** parameter takes the form *LBLhLBLh* (for example NAME=PST8PDT7), where the first *LBL* is the 3-letter label that designates "standard time" in that time zone, and the second *LBL* designates "daylight savings", if any, in that time zone. The first and second "*h*" values designate the number of hours west of UTC for standard and daylight savings time, respectively. These numbers may be expressed in one of three forms:

| | |
|---|---|
| n | 'n' hours west of UTC (-n if east) |
| h:m | 'h' hours and '*m*' minutes west of UTC (-h:m) |
| n.m | 'n.m' hours (i.e. decimal fraction) west of UTC |

The given example, NAME=PST8PDT7, would be used for Pacific Standard Time with daylight savings. When daylight savings is NOT to be used, just enter the same values for the first and second "*LBL*" and "*h*", e.g. NAME=PST8PST8.

The **START** and **STOP** values give the date and time daylight savings starts and stops, according to the notation: *wDayMonTime*, where:

| | |
|---|---|
| Day | the day of the week ('Sun', 'Wed', etc.) |
| Mon | the month |
| w | which such 'Day' of the month (e.g. '1' for the first, etc., and '5' denotes "last") |
| Time | h:m is the time to switch to the new mode |

The new rule that became effective in 2007 for most U.S. time zones (and the *default* for **START** and **STOP**) is:

START=2SunMar2:00 STOP=1SunNov2:00

which declares that daylight savings starts on the second Sunday of March at 2 AM and ends on the first Sunday of November at 2 AM.

### 6.3.7 CHANGE PASSWORD - CHGPASS

**Syntax: chgpass OLD=<old> NEW=<new> CONFIRM=<new>**

The **chgpass** command is used to change a user password on the system console. The command is only allowed if the user is logged *in*.

All three parameters can be given on the same line as the command. None of those entries are echo-suppressed. However, if parameters are omitted from the command line, the console will prompt for them, and the responses will be echo-suppressed. (Previous versions of the DT-6X60 used **PASSWD** and **NEWPASS** instead of **OLD** and **NEW**; the old variations are still supported.)

If the current password is valid and the two entries for the new password match, the password is changed to the new value.

### 6.3.8 RESET PASSWORD - RSTPASS

**Syntax: rstpass**

The DT-6X60 has a user changeable password that is used to gain access to the console. If the password should become misplaced, console access would not be available for configuration and administration. The user may recover from this situation using the **rstpass** command. This command is always available regardless of whether the platform console is logged in or not. The **rstpass** command displays unique identification about this particular device along with a specially constructed access code and then prompts for the key. The user may then contact the manufacturer with the device information and access code to obtain the ***software key***.

The ***software key*** is an eight character alphanumeric that is valid one time only for this particular DT-6X60. If a valid key is entered the user password is reset to the original value of ***initial***. If an invalid key is entered the message ***"key is not valid for this system"*** is generated.

### 6.3.9 SET CONSOLE TIMEOUT - TIMEOUT

**Syntax: timeout [ <number of seconds> | off ]**

The **timeout** command is only allowed when the unit is logged in.

The DT-6X60 hard-wired serial console uses a three-wire interface (RD, TD, GND), and the lead state of other signals is not relevant. This would imply that the only way to change the state of the console is to explicitly log in or log out, or reboot which forces the console to be logged out.

For users who wish the console to automatically log off after a period of inactivity, there is a console timer. The console timer defaults to the disabled condition, and may be activated by the **timeout** command.

The **<number of seconds>** value must be between 30 and 1000, inclusive. To check what the present value is, use the **timeout** command without any arguments, or see the timeout value in **vfy mod**.

When the DT-6X60 determines that the period of inactivity of the specified time has elapsed, it automatically forces the console to log off. An **INFO**-level alarm is issued at that time. Since the telnet console acts in parallel with the hard-wired serial console, the timer is restarted on input from either source, and the automatic logoff is effective to both.

## 6.4 SYSTEM PLATFORM CONFIGURATION – IP NETWORK RELATED COMMANDS

### 6.4.1 CLOSED USER GROUPS - CUG

**Syntax: cug <cugnum>[ipaddr=<d.d.d.d>][submask=<d.d.d.d>]**

The **cug** command is only allowed when the unit is logged in.

The **<cugnum>** parameter is the closed user group identifier used to assign the CUG to the telnet platform console (with the console command) or to the SNMP interface (with the **SNMP** command). If the console is configured with one or more CUGs, only callers belonging to those CUGs may connect via telnet to the platform console, If SNMP is configured with one or more CUGs, only callers belonging to those CUGs are allowed to issue GETs and SETs. If no CUG is assigned to SNMP, any caller is allowed to do SETs and GETs. (SNMP also requires adherence to the community strings configured for SET and GET.)

A single IP address and subnet-mask pair specifies each CUG. The **ipaddr** parameter is an IP address or the base address of an IP subnetwork that identifies members of the group. The caller's IP address *AND'ed* with the **submask** must agree with a CUG's **ipaddr** value *AND'ed* with the same **submask** value for the caller to belong to the CUG. Depending on the **submask** value, this allows an individual (submask=255.255.255.255), intermediate, or network-wide level of authorization.

Setting the **ipaddr** value to **0.0.0.0** deletes any prior configuration for the **<cugnum>**. A **<cugnum>** may not be deleted if it is currently assigned to SNMP or the console.

A list of all configured CUGs is reported via the **vfy cug** command. The list of closed user groups associated with SNMP is displayed as part of the **vfy snmp** command. The list of closed user groups associated with the console is displayed by the **vfy console** command.

### 6.4.2 CONSOLE

**Syntax: console cug=[+|-]<cuglist> | cug=none**

**Where <cuglist>=<cugnum>[-<cugnum>][,<cugnum> | ,<cugnum>-<cugnum>]**

The **console** command is only allowed when the unit is logged in. The **console** command configures the list of closed user groups (CUGs) that defines which IP addresses are allowed to connect to the platform telnet console. The closed user groups must first be configured using the **cug** command; then they may be added to the **console** CUG list. A plus (+) adds the list of cug numbers to the list; a minus (-) deletes them. Invoking the command with no plus or minus sign before the list, resets the numbers in the console list to those specified, deleting any already defined for the console. The list of cug numbers is separated by commas, or dashes may be used for ranges. Multiple invocations of the command are cumulative.

### 6.4.3 IP ADDRESS(ES) – IPADDR, SUBMASK, IPOTHER, IPPUBLIC

**Syntax: ipaddr [d.d.d.d] *(IP address)***

**submask [d.d.d.d] *(subnet mask)***

The **ipaddr, ipother, ippublic** and **submask** commands are only allowed when the unit is logged in.

The **ipaddr** field is the IP address of this unit.

The **submask** field is the subnet mask for the LAN segment on which the unit is located. It defaults to **255.255.255.0**.

The IP address and subnet mask are used to determine whether a destination IP address is on the same LAN segment, or if a gateway hop is required. If it is necessary to reconfigure a DT-6X60 to a new subnetwork, first set the **gateway** to **none**, then change the **ipaddr**, then set the new **gateway**.

When one of these commands is invoked without its argument, it will display the current configuration of the unit. When invoked with its argument, the current configuration is changed accordingly.

When this DT-6X60 is run in the high availability configuration as part of a duplex pair, two other IP addresses are required. The **ipaddr**, **ipother**, and **ippublic**, must be part of the same subnetwork as defined by the **submask**.

```
Syntax: ippublic [d.d.d.d]
        ipother  [d.d.d.d]
```

The address **ipother** is the IP address of the other/companion DT-6X60 in the pair. The address **ippublic** is the shared address of both units. Only one unit is active at a time.

Before configuring a pair of DT-6X60's for high availability, they should each be configured with their own **ipaddr**, and with the appropriate **gateway**, and **submask**. *The two DT-6X60's must be on the same network, which is to say the IP addresses of the two DT-6X60s must have the same network ID.* See section 6.9 for additional detail and commands regarding the High Availability feature.

Changes to these system parameters do not become effective until after the next **reboot**.

### 6.4.4 GATEWAY

```
Syntax: gateway [d.d.d.d]
```

The **gateway** command is only allowed when the unit is logged in.

The **[d.d.d.d]** field is the IP address of the gateway router to be used to reach a destination IP address on a different LAN segment. Invocation of the command with no arguments causes it to output the current value for **gateway**. The **gateway** must be in the same subnetwork as **ipaddr** as defined by the **submask**.

When one of these commands is invoked without its argument, it will display the current configuration of the unit. When invoked with its argument, the current configuration is changed accordingly.

The **gateway** must belong to the same subnetwork as the module. That is, the part of the **gateway** address corresponding to the non-zero part of the **submask** must match the corresponding part of the **ipaddr**. If it is necessary to reconfigure a DT-6X60 to a new subnetwork, first set the **gateway** to **none**, then change the **ipaddr**, then set the new **gateway**.

Changes to these system parameters do not become effective until after the next **reboot**.

### 6.4.5 HOSTNAME

```
Syntax: hostname [<host.domain name> | none ]
```

The **hostname** command is only allowed when the unit is logged in. Invocation of the command with no arguments causes it to output the current value for **hostname**.

The DT-6X60 is itself an IP entity. It has an IP address associated with it, and may also have a domain-style name. The ipaddr is specified by the **ipaddr** command described above. The **hostname** can be a fully qualified name, **host.domain name**, or a simple name of 24 or less characters. The value **none** deletes any hostname previously defined.

After the hostname is input or changed, the DT-6X60 must be rebooted in order for the name to become effective.

### 6.4.6 CONFIGURE HOST NAMES - HOSTS

**Syntax: hosts add|del IP=d.d.d.d name=<name> … name=<name>**

The **hosts** command is only allowed when the unit is logged in.

The **hosts** command is used to configure the hosts translation table.

The DT-6X60 can maintain a set of domain-style mnemonic names for originating calls to the IP network, analogous to the /etc/hosts file on both UNIX and Microsoft Windows platforms. This allows the DT-6X60 to perform a translation between a user-provided domain-style name and its associated IP address during call setup without using a DNS server. The use of a mnemonic name is optional; the DT-6X60 will always accept an IP address in its base form. If the name is not present in the **hosts** table, then the resolution of the name to an IP address is attempted via the DNS servers specified in the **dns** command below.

The **name** parameter value is a mnemonic of 24 characters or less in length, using upper and lower case letters, digits, and the '-' (hyphen) and '.' (period) characters. Upper and lower letters are treated the same. That is, the name value is case insensitive. More than one name can have the same resultant IP address. When using the **del** option, the reserved value **all** can be used as the name value to delete all names associated with a particular IP address. If all names are deleted for an IP address, then the IP address is removed from the table as well.

### 6.4.7 CONFIGURE DOMAIN NAME SERVER - DNS

**Syntax: dns [ name<n>=<name> ] [ ipaddr<n>=d.d.d.d ] (n=1,2,3)**

The **dns** command is only allowed when the unit is logged in.

The **name1**, **name2**, and **name3** parameters are domain names. These domain names are appended to a domain-style name that is not fully specified for DNS purposes. For example, a name "bender.ho.lucent.com" is fully specified, so nothing is appended by the DT-6X60. A name such as "bender" would need to have a domain appended before the DNS server could resolve it. The DT-6X60 will append the specified domain names in the order of **name1** through **name3**, and send the resulting strings to the DNS server in succession until the latter is able to perform a resolution. The name can consist of upper and lower case letters, hyphen, digits, and the '.' (period) character. The names are case insensitive and can be any length.

Each **ipaddr<n>** field is the IP address of a Domain Name Server to be used to resolve domain-style addresses not defined in the **hosts** table. The DNS IP addresses are used in the order specified. If only one address is to be defined, it should be **ipaddr1**.

Each time the **dns** command is run, the user is prompted for all values except for those specified on the command line. The user is prompted in the following order: **name1, name2, name3, ipaddr1, ipaddr2, ipaddr3.** In order to delete a value, reply to a prompt with the word "**none**" or on the command line, type the parameter name with no value following; for example,

**dns ipaddr1=** or **dns name2=**

### 6.4.8 CONFIGURE ETHERNET INTERFACE – PHY

**Syntax: phy [auto | 10hdx | 100hdx]**

The **phy** command is only allowed when the unit is logged in.

The **phy** command allows one to configure the type of Ethernet interface connected to the DT-6X60. The default is **auto.** The last two options force the physical ethernet layer to 10 or 100 half-

duplex, while 'auto' allows auto-configuration. The 'phy' configuration is independent for the two machines in a redundant configuration. The interface has to be set in each machine. This command is used in conjunction with the **delay** parameter of the **stby cfg (**in section 6.9.3) command only when necessary. The recommendation is to not set the value for **phy**, which means it will default to **auto**.

### 6.4.9 MANAGE LIST OF COMPANION DT PRODUCTS – DTPRODUCT, VFY DTPRODUCT

```
Syntax: dtproduct: add|del <ipaddr> [<ipaddr> ...]
        vfy dtproduct
        dtproduct list | vfy
```

In this version of the platform software, coupled with newer software versions of DT-6X60 applications and other Datatek products, TCP connection breakage is detected automatically. The **dtproduct** command is no longer necessary when the user's network is running newer software versions.

The **dtproduct add** command adds the given IP addresses to a list of network elements to be treated specially whenever the DT-6X60 reboots (or, in the case of a redundant DT-6X60, when switchover between *active* and *standby* occurs). The special treatment accelerates the reestablishment of TCP connections between applications on the DT-6X60 and those network elements. Only Datatek-manufactured IP-based network elements, such as the DT-4XXX and the UMI, are able to respond to this acceleration treatment. IP addresses are deleted from this list by **dtproduct del**.

Under various conditions of equipment and network outage, it can sometimes take time (minutes) for IP connections to close and reconnect. This special acceleration helps reduce downtime for those connections between a rebooting DT-6X60 and other Datatek products. To enable the DT-6X60 to use this feature, the user uses the *optional* **dtproduct** command to build a list of IP addresses for which this feature is to be used. Properly configured, this feature helps reestablish the connections between a DT-6X60 and other Datatek network elements very quickly after a DT-6X60 is rebooted. Non-Datatek equipment will not respond to this treatment.

The **dtproduct** list may be viewed with the **vfy dtproduct, dtproduct list,** or **dtproduct vfy** commands.

*Note: This is an optional configuration to improve performance and reliability after network equipment outages, and is not required for correct functionality.*

**Here are some guidelines to decide when to use the dtproduct command with older software versions of these products:**

- If any application on the DT-6X60 has been configured to originate calls to a DT-4XXX or UMI with IP address **'A'**, then it is beneficial to add **'A'** to the **dtproduct** configuration.
- If a DT-4XXX or UMI with IP address **'B'** has been configured to originate calls to this DT-6X60, then it is beneficial to add **'B'** to the **dtproduct** configuration for this DT-6X60.
- If a DT-4XXX or UMI at address **'C'** has been permanently removed from the network or no longer has connections configured with this DT-6X60, it is beneficial to delete **'C'** from the **dtproduct** configuration of this DT-6X60.
- The absence of one or more DT-4XXX's from the network when they occur in the **dtproduct** list on a DT-6X60 can cause up to a 10-second (total) delay when rebooting that DT-6X60.
- There is very little overhead in adding **'D'** to a **dtproduct** configuration of a DT-6X60, as long as the DT-4XXX associated with **'D'** is usually up and running when this DT-6X60 is rebooted; otherwise the 10 second boot delay described above may apply. However, a list larger than 40 or 50 should be carefully managed.

## 6.5 SOFTWARE ADMINISTRATION COMMANDS

### 6.5.1 INSTALLING A PLATFORM UPGRADE - INSTALL

**Syntax: See section 6.5.3 below.**

Platform upgrades use the **install** command using the same approach as *application* installation, with platform upgrades distinguished from application installation in the naming of the upgrade files. Platform upgrades are always named ***basexupd***. Before upgrading the platform, users should study the installation procedures in the release notes for the given upgrade, because the order of installation and the sequence of rebooting between installation steps is **very important**, and may be different from one release to the next.

### 6.5.2 PLATFORM SOFTWARE REGISTRATION - REGISTER

**Syntax: register [ <key> ]**

When a new release of the platform software is installed or when a new DT-6X60 is purchased with software already installed, the software must be registered. Please call Datatek for a registration key. Until the platform software is registered, all DT-6X60 console commands are still effective, but applications will not run.

The **register** command accepts the key on the command line. The key is based on the **product code** (DT-6X60), the software version (the two-part **build number**, e.g. *16.0*) of the platform software, and the hardware **serial number** and **MAC address** of the DT-6X60. If the key is not given on the command line, the information required for registration is displayed and the user is prompted to enter the key. If the key entered is correct, any registered applications that have been previously assigned to instances will start.

### 6.5.3 INSTALL AN APPLICATION - INSTALL

**Syntax: install NAME=<app-list> SRV=<host> ID=<host login>**
**PASS=<password> LOC=<directory on host>**

An application may be initially installed, or upgraded, using the **install** command.

*Note: The application software package file must first be placed on an FTP server accessible to the DT-6X60.*

The **install** command is invoked from the DT-6X60 platform console and accepts:

- The **NAME** parameter is a comma-separated list of application names or platform update names.
- The **SRV** parameter is the IP address of the FTP server. It may be entered as a domain-style address if the DNS and/or HOSTS configurations have been established.
- The **ID** parameter is the user id to be used on that FTP server.
- The **PASS** parameter is the password associated with the user id on the FTP server
- The **LOC** parameter is the location *(directory name if not /dt6X60/apps)* of the DT-6X60 application files on the FTP server,

The **install** command will then operate as an FTP client to acquire the application files from the FTP server. Once the application files have been acquired, the **install** command will disconnect from the FTP server, and unpack the application into its proper locations on the DT-6X60. In doing so, the DT-6X60 will display the *sum* of each application or platform update, which may be compared with the sum documented in the release notes for that release.

If parameters are omitted from the command line, **install** will prompt for them. When prompted for the password, input is not echoed. Note that it is necessary to specify **ID** and **PASS** only if the FTP server is not a standard anonymous FTP.

The *install* command remembers the last SRV and LOC and provides them as defaults for the SRV and LOC prompts.

Multiple applications may be downloaded from the same SRV and LOC in a single invocation of *install*. This is accomplished by listing all the application names separated by commas with NO spaces as the value of NAME: e.g. `install NAME=tn3270,x25pad etc.`

Only applications that have been built to be compatible with the platform software in a DT-6X60 can be used in a DT-6X60. Consult the latest release notes for DT-6X60 platform software to see the current list or the release notes for the particular application.

### 6.5.4 APPLICATION SOFTWARE REGISTRATION - REGAPP

**Syntax: regapp [ <key> ]**

Each application that is installed or upgraded on a DT-6X60 must be registered in order for it to run. Please contact Datatek for a registration key. The key is based on the **application name**, the software version (the two-part **build number**, e.g. *9.1*) of the application software, and the hardware **serial number** and **MAC address** of the DT-6X60. An unregistered application may be assigned to instances, but they will not start until the application is registered.

The **regapp** command accepts a key on the command line. If the key matches an installed application, that application becomes registered. If a key is not given on the command line, a list of unregistered applications is displayed followed by the module hardware information. Then the user is prompted for a key.

### 6.5.5 APPLICATION ASSIGNMENT TO INSTANCE(S) - APP

**Syntax: app <instance> [cnt=<number>] [type=<type>|none]**

As noted earlier, the DT-6X60 simultaneously supports many ***instances*** of different applications. The number and type of application must be configured as a system parameter. This is done with the **app** command. The **app** command will allow the installation of any supported and properly installed application into an *instance*. There are *N* such instance slots available *(30 for a DT-6160 and 48 for a DT-6260)*. Any combination of applications is supported with two exceptions. For either the **IP-LTCN** or **IP-VCON** applications, the application is installed in instance 1 only, and must be the only application assigned to an instance in the processor.

The **<instance>** is the location where the selected application is to be installed. There exist ***N*** such instances on the DT-6X60. If there was a prior application in the location specified, it is replaced by the new application.

The **cnt=<number>** is an optional parameter that allows multiple consecutive instance locations to be configured identically. When this parameter is not used, the number of instances affected by the command is one. (Previous versions of the DT-6X60 used **num=** for this purpose. The older syntax is still supported.)

The **type=<type>** is a required parameter that defines the application to be installed in the instance specified. If the value is **NONE**, then any application in the instance specified is deleted (including its configuration). The **type** must be the name of an application previously installed on the DT-6X60 by the **install** command.

### 6.5.6 RESET AN APPLICATION PASSWORD - RSTAPP

**Syntax: rstapp <instance>**

Each application instance is allowed to have its own user changeable password for configuration purposes. In the event that the password is lost, it may be necessary to reset this password back to the initial value. Normally, this could be done by deleting the application instance and re-installing one of the same type. However, that approach would also delete all configuration of that application instance, and would be disruptive to the operation of the components served by the application instance. The **rstapp** command resets the application instance password by deleting its password file. This resets the password back to the value ***initial***.

The **<instance>** is the application instance for which the password is to be reset. The instance must be removed and restored to service for the password change to take effect.

### 6.5.7 UNINSTALL AN APPLICATION - UNINSTALL

**Syntax: uninstall NAME=<app>**

The **uninstall** command is used to make room to install a new application type.

### 6.5.8 BACKUP AND RETRIEVE APPLICATION CONFIGURATION DATA – BACK, RETR (RELOAD)

The backup command uses **ftp** to send a package containing the entire application configuration to the user's backup server. The retrieve (or reload) command can retrieve all of the configuration or just the portion associated with some instance(s).

```
BACK SRV=<Host IP Address>
        [ID=<Host Login ID if not anonymous>]
        [PASS=<Host Password if not anonymous>]
        [LOC=<Path on FTP Server if not/dt6X60/backups/<label>>]
        [FILE=<backup filename>]


RETR | RETRIEVE | RELOAD all SRV=<IP Address>
        [ID=<Host Login ID if not anonymous>]
        [PASS=<Host Password if not anonymous>]
        [LOC=<Path on FTP Server if not /dt6X60/backups/<label>>]
        [FILE=<backup filename>]

RETR | RETRIEVE | RELOAD <instance#> [ <instance#> … ] SRV=<IP
Address>
        [ID=<Host Login ID if not anonymous>]
        [PASS=<Host Password if not anonymous>]
        [LOC=<Path on FTP Server if not /dt6X60/backups/<label>>]
        [FILE=<backup filename>]

where:

dt6x60 must be either dt6160 or dt6260
```

The backup package saves platform and application configuration. Platform configuration comprises the list associating instance numbers with application types, the application keys, the ***dns*** and ***hosts*** configuration, the ***snmp*** configuration, the console ***timeout***, the ***banner***, and the ***dtproduct*** list.

The IP address of the server may be given as a domain-style address if the DT-6X60 has been configured with a working DNS or HOSTS configuration. The default **<label>** above is either the *IP* address of the DT-6X60 or the configured ***label***. The user may choose a unique name for FILE (the default name is ***bkup***).

The **back** and **retr** commands remember the previous **SRV**, **LOC**, and **FILE** values and provide them next time as defaults for the **SRV**, **LOC**, and **FILE** prompts.

#### 6.5.8.1 DT6BACKUP AND DT6RELOAD UTILITIES

A new set of utilities is available which allows the mechanization of the backup and retrieve/reload processes. They are called **DT6backup** and **DT6reload** respectively. The advantages are:

- The DT-6XXX administrator can write a simple script with an easily remembered name containing the command lines calling these utilities and schedule the script to run periodically. That way the backup and or reloads can be executed when system activity is not high. Also the administrator does not have to remember to run the script.
- The administrator does not have to manually log into each DT-6X60, which can consume much time and is prone to typing errors etc., nor does the administrator have to remember the individual passwords for each DT-6X60 or the order and delimitation flags for the parameters on the command lines.

The DT6backup and DTreload utilities use the **back** and **retrieve** command respectively, and hence can be used also with older releases of DT-6X60 platform software.

More detail about these utilities can be obtained from the combined release notes/user manual for the utilities, which is available for download from the Datatek Applications web site via the support link.

## 6.6 REINITIALIZING THE DT-6X60 - REBOOT

**Syntax: reboot**

After the DT-6X60 is properly configured with system parameters, it must be restarted in order for the IP configuration to take effect. This is performed with the **reboot** command from the system console. The **reboot** command has no arguments. It will restart the system so that any new global parameters may take effect.

## 6.7 SNMP CONFIGURATION - SNMP

**Syntax: snmp get=<communities> set=<communities>**
**trap=<community> dest=<IP address> cug=[+|]<cuglist>**
**(prompted: sysName=<esc> sysLoc=<esc> sysContact=<esc>)**

The **snmp** command is only allowed when the unit is logged in.

The **snmp** command configures or verifies the parameters needed to permit the SNMP agent to communicate with a manager using closed user groups and user-specified communities for **get**s and **set**s. The DT-6X60 will not respond to other community names. The **<communities>** parameter accepts a comma-separated list of community names. The communities configured for **set** also work for **get**, so they need not be repeated in the **get** parameter. The closed user group option **(cug)** defines which IP addresses are allowed to do **get**s and **set**s. Values are saved in non-volatile memory. There is only one **trap=<community>**. The **dest=<IP address>** parameter configures the IP address of the target trap manager. The **snmp vfy** command (same as **vfy snmp**) displays the current settings of SNMP configuration.

The **snmp** command prompts for all parameters not specified on the command line. Simply type **snmp** in order to add or change any parameters. If the present value that is printed is to be retained, hit newline in response to the prompt. In order to add to an existing list for the **set** and **get** communities, type in the old values as well as the additions for that parameter when prompted.

To delete all values for a keyword, type the word "**none**" as the value. Special characters and escape sequences are accepted for community strings, **sysName**, **sysLoc**, and **sysContact** parameters, but must be entered at the prompt for that parameter, not on the command line.

When the SNMP configuration is changed, the agent is restarted. Whenever the DT-6X60 reboots or the agent is restarted, a warm-start trap is sent to the configured trap manager. The only other trap sent by the DT-6X60 platform agent is "authentication fail" when a manager attempts to use a community name not on the list. This trap is only sent if a manager has enabled it to be sent.

The snmp **sysName**, **sysLoc**, and **sysContact** are changeable via an SNMP manager as well as via the console.

The enterprise object ID of the **DT-6160** platform is **1.3.6.1.4.1.3791.3.13,**

for the **DT-6260** it is **1.3.6.1.4.1.3791.3.14,**

and for the **DT-6061** it is **1.3.6.1.4.1.3791.3.7**

.

## 6.8 RUN-TIME COMMANDS

### 6.8.1 DISPLAY CONNECTIONS – DC OR DCONN

**Syntax: dc | dconn [app [app#]][ -f ] [ -a ]**

The DT-6X60 may have thousands of TCP connections to other elements. A complete list of these connections is reported by the **dc** (or **dconn**) command. The optional **-a** causes the report to include the listening ports awaiting connection requests. The following is a **dc** report example:

```
< DT-6X60> dc
Active Internet connections
Proto Recv-Q Send-Q  Local Address          Foreign Address     (state)
tcp        0      0  192.168.8.250.10002    135.17.59.198.34052
ESTABLISHED
tcp        0      0  192.168.8.250.10010    135.17.59.198.34054
ESTABLISHED
tcp        0      0  192.168.8.250.1340     192.168.8.15.31000
SYN_SENT
udp        0      0  192.168.8.20.1030              *.*
udp        0      0  192.168.8.20.9998              *.*
```

In the above report, “Recv-Q” and “Send-Q” indicate the number of bytes currently buffered for receive processing, or queued for transmission, respectively. Note that no foreign address is shown in the case of UDP protocol, because UDP is a connectionless protocol. The following are the possible TCP connection states:

| | |
|---|---|
| BOUND | Bound to a local address, ready to connect or listen. |
| CLOSED | Closed. The socket is not being used. |
| CLOSING | Closed, then remote shutdown; awaiting acknowledgment. |
| CLOSE_WAIT | Remote shutdown; waiting for the socket to close. |
| ESTABLISHED | Connection has been established. |
| FIN_WAIT_1 | Socket closed; shutting down connection. |
| FIN_WAIT_2 | Socket closed; waiting for shutdown from remote. |
| IDLE | Idle, opened but not bound. |
| LAST_ACK | Remote shutdown, then closed; awaiting acknowledgment. |
| LISTEN | Listening for incoming connections. |
| SYN_RECEIVED | Initial synchronization of the connection underway. |
| SYN_SENT | Actively trying to establish connection. |
| TIME_WAIT | Wait after close for remote shutdown retransmission. |

A variation of the **dc** command:

**dc app [ -f ] [ -a ]**

reports only connections that are associated with *instances*, and shows the *instance* ownership of each connection. The list is sorted by local port number. The optional **-f** flag sorts the list by foreign IP address and port number. The following is a **dc app** report example:

```
< DT-6X60> dc app
Active Internet Connections by Applications (sorted by local address):
   Type Inst FD  Local Addr               Foreign Addr
  b2aprt 10 .5   192.168.8.250.1340      192.168.8.15.31000
  tn3270 2  .5   192.168.8.250.10002     135.17.59.198.34052
  b2aprt 10 .4   192.168.8.250.10010     135.17.59.198.34054
```

Note that in the above report, “FD” (file descriptor) is only for use during software development or troubleshooting.

The connections may also be viewed from an SNMP manager.

### 6.8.2 DISPLAY MEASUREMENTS – DM OR DMEAS

**Syntax: dm|dmeas [ -d ] ip | tcp | udp | icmp | con | eth**

The DT-6X60 platform maintains measurements of network activity as an aggregate of all the application instances. The measurements are grouped into six categories. The measurements for any one of the categories may be reported by the **dm** command, giving one of the categories as a parameter. The categories IP, TCP, UDP, ICMP, and ETH report measurements for that protocol. The CON report shows the current number of connections. The optional **-d** reports the differences between the current measurements and the previous results from **dm**. There is no way to clear the measurements.

These measurements may also be viewed from an SNMP manager. Appendix 10 shows sample reports along with information about the individual measurements for the four protocol categories.

### 6.8.3 DIAG COMMAND - DIAG

**Syntax: diag <subcommand> <parameters>**

The **diag** command reports a variety of reports and statistics from the DT-6X60 console and can aid in network monitoring and troubleshooting. Using the **diag** command with no recognized suboptions results in the message:

```
diag: Invalid command
```

Here are the various subcommands of **diag**:

#### 6.8.3.1 ADDRESS – DIAG ADDR

**Syntax: diag addr <IP Address> <port>**

The **addr** subcommand reports the instance associated with the supplied IP address and port. If the **<port>** parameter is **0**, all instances with ports associated with the supplied IP address are reported.

#### 6.8.3.2 CPU – DIAG CPU

**Syntax: diag cpu**

The **cpu** subcommand reports *CPU* utilization by process. Processes may be associated with instance numbers as reported by the **vfyapp** command.

**Sample Output**

```
diag cpu
0: 398711    99%
1: 5014       1%
Interrupts stopped: 0 started: 0
      init      - k:       13 u:        0
      none      - k:        1 u:        1
      onsite    - k:        5 u:        4
      none%0    - k:        3 u:        2
      none%1    - k:        1 u:        1
      none%2    - k:        2 u:        1
      none%3    - k:        2 u:        0
      .
      .
      .
      tn3270    - k:      144 u:       59
      tn3270%0  - k:      146 u:       63
      cme       - k:        0 u:        0
      none%a    - k:        4 u:        1
      tn3270%1  - k:      115 u:       66
      tn3270%2  - k:      119 u:       35
      none%b    - k:        3 u:        1
```

Notes:

- First line (0:) shows total kernel plus idle time*
- Second line (1:) shows total application time*
- Subsequent lines show kernel (k:) and application (u:) time* for each thread.
- Thread names contain an application type name or a system thread name. (There is no relation between thread names and particular instance numbers.)

*All times are in 100'ths of a second.*

#### 6.8.3.3 DEVICE – DIAG DEV

**Syntax: diag dev *(use lower case)***

The **dev** subcommand reports *CPU* utilization and interrupt counts by category, including device drivers, system, applications, and scheduler (idle). The command prints utilization percentage and interrupt counts *since the last dev command*.

**Sample Output**

```
diag dev
*** IV ***
  con: 0          0% 89
  sch: 629        0% 121120
```

```
 sclk: 0          0% 113992
 eth0: 132        0% 8912
 SW+0: 127        0% 4682
 SW+1: 0          0% 5700
 SW+2: 0          0% 2280
  sys: 4886       1%
  app: 305        0%
sched: 407077    99%
```

Notes:

Each line represents a gross category of CPU usage. The numbers in each line are:

- total CPU time used (in 100'ths of seconds) since boot (can wrap around)
- percentage of available CPU time used since the previous 'diag dev'
- the count of events since the last 'diag dev'.

*The most useful part of the report is the percentage (2nd number).*

Category key:

| | |
|---|---|
| con | - arriving system console characters (very small) |
| sch & sclk | - system scheduler clock ticks |
| eth0 | - low-level handling of transmitted or received packets |
| SW+0,1,2 | - handling TCP traffic |
| sys | - total time used by applications in common platform code |
| app | - total time in application code |
| sched | - idle time |

*(sys, app, and sched do not have event counts)*

The elapsed time since the previous **'diag dev'** can be derived from the 'sclk' category report; its event count represents clock ticks, or 1/100ths of seconds.

#### 6.8.3.4 KILL CONSOLE – DIAG KILLCON

**Syntax: diag killcon <instance> | platform**

The **diag killcon** command provides a means to free up the telnet port of an instance or the platform in case someone left it connected and someone else needs to use it. The telnet connection is broken without terminating the instance or rebooting the platform. Since TCP does not provide an approved means for a third party to break the connection, this command should not be routinely used. It does not, for example, shut down or notify the far-end telnet client. Only when the client tries to send new input will it find out the connection is broken.

To avoid the need to use the **diag killcon** command, and to increase security, it is recommended that all application consoles and the platform console be configured with a timeout (via the **timeout** command) that automatically logs off the console after a period of activity.

#### 6.8.3.5 PING – DIAG PING

**Syntax: diag ping [-c <count>] [+c] <IP Address>**

The **ping** subcommand is the same as the **ping** command shown below in section 6.8.4

#### 6.8.3.6 TRACE ROUTE - DIAG TRACERT OR DIAG TRTE

```
Syntax: diag tracert <IP Address>
        diag trte    <IP Address>
```

The **diag tracert** command is the same is the **tracert** command shown below in section 6.8.7 except this form of the command cannot use the "**+n**" parameter.

### 6.8.4 PING

```
Syntax: ping [-c <count>] [+c] <IP Address>
```

The **ping** command verifies connections to remote computer or computers, by sending 3 ICMP echo packets, one second apart, to the remote computer and listening for echo reply packets. The IP address can use a domain-style address, providing the **dns** and/or **hosts** configuration has been properly entered.

The **–c <count>** option specifies the number of times the **ping** command is executed. It overrides the default of 3.

The +**c** option with no number means that the **ping** command executes indefinitely until the console user enters a **del** (delete) character in order to kill it.

### 6.8.5 REMOVE OR RESTORE AN INSTANCE – REMOVE, REM, RM, RESTORE, RES, OR RS

```
Syntax: remove  | rem | rm <instance> [ cnt=<num> ]
        restore | res | rs <instance> [ cnt=<num> ]
```

The **remove** (also **rem** or **rm**) and **restore** (also **res** or **rs**) commands may be used to suspend and resume the operations of one or more instances without changing or losing the configurations associated with those instances.

The **<instance>** parameter is the application instance to be removed from or restored to service. Multiple instance numbers may be given in one command. The optional **cnt=<num>** parameter specifies some consecutive number of instances to be removed or restored.

While an instance is out of service, it maintains no connections with any other network equipment. Its console is also out of service, and thus no configuration changes may be made in that instance. The **vfy app** and **vfy cfg** commands show the instances that are out of service.

### 6.8.6 RESTART AN INSTANCE - RESTART

```
Syntax: restart <instance> …
        restart all
```

The **restart** command is used to restart an application instance. This action will stop any data transport for that particular instance and disconnect any TCP connections, including the application's console. The **<instance>** parameter is used to specify the application instance number to be re-started. Multiple **<instance>** numbers may be given in one command to restart multiple instances or the value **all** may be specified.

### 6.8.7 TRACE ROUTE – TRTE OR TRACERT

```
Syntax: trte | tracert [+n] <IP Address>
```

The **trte** command determines the route taken to a destination by sending Internet Control Message Protocol (ICMP) echo packets with varying Time-To-Live (TTL) values to the destination. Each router along the path is required to decrement the TTL on a packet by at least 1 before forwarding it, so the TTL is effectively a hop count. When the TTL on a packet reaches 0, the

router is supposed to send back an ICMP Time Exceeded message to the source system. **Tracert** determines the route by sending the first echo packet with a TTL of 1 and incrementing the TTL by 1 on each subsequent transmission until the target responds or the maximum TTL is reached.. The route is determined by examining the ICMP Time Exceeded messages sent back by intermediate routers.

The IP address can use a domain-style address, providing the **dns** and/or **hosts** configuration has been properly entered.

### 6.8.8 VERIFY CONFIGURATION SETTINGS - VFY

The **vfy** command is used to report configuration settings for the following categories using the indicated syntax:

- **vfy app** - application installation and run-time status
- **vfy banner**
- **vfy cfg …** - application instance selection
- **vfy console** – cug list for the console
- **vfy cug** - closed user group definitions
- **vfy dns** - domain name server configuration
- **vfy dtproduct**
- **vfy hosts** - host-IP translation table
- **vfy mod** - module configuration and status
- **vfy snmp** - snmp settings
- **vfy stby** – for duplex configurations only (see sections 6.9.3 and 6.9.4.)

The verify reports for **banner**, **cug**, **dtproduct**, **dns**, **hosts**, and **snmp** are simple representations of the configuration parameters described in each corresponding command. The more complex verify reports are explained in this section.

#### 6.8.8.1 VERIFY RUNNING APPLICATIONS – VFY APP OR VFYAPP

**Syntax: vfy app**

**vfyapp**

The **vfy app** (or **vfyapp**) command shows the list of installed applications, along with their build (revision) numbers and build dates. Unregistered applications are displayed with the notation "`not registered`." The display continues with a list of applications currently running in each application slot *(instance)*, including "none", along with an internal identifier. Instances that are removed from services will show an "`oos`" status. Instances configured for an unregistered application will show an "`unreg`" status. For some applications, there may occasionally appear a short temporary status report generated by some instances of the application.

#### 6.8.8.2 VERIFY CONFIGURED APPLICATION INSTANCES – VFY CFG OR VFYCFG

**Syntax: vfy cfg [<instance> [cnt=<num>]]**

**vfycfg [<instance> [cnt=<num>]]**

The **vfy cfg** (or **vfycfg**) command displays each configured instance, and what application type is configured on that application instance.

The **<instance>** parameter is an optional argument to specify the beginning instance number to begin the display. If not specified, it defaults to the number one. The report displays the instance number and application installed on that number. If the **cnt=<num>** parameter has also been specified, that number of *configured* instances will be displayed starting from the given instance number. (Previous versions of the DT-6X60 used **num=** for this purpose. The older syntax is still supported.) With no parameters, all configured instances are displayed.

#### 6.8.8.3 VERIFY MODULE – VFY MOD OR VFYMOD

**Syntax: vfy mod**

**vfymod**

The **vfy mod** (or **vfymod**) command shows the DT-6X60 module parameters and properties: Registration status, system label, IP address, subnet mask, gateway IP address, the physical Ethernet configuration, the redundancy status and configuration, if any, host name, MAC address, serial number, the manufactured "right to use" value, the platform software revision number and date, and the elapsed time since the system was booted. If platform installation is incomplete, an additional line of information shows the next action required. If the platform software is not registered, an additional line says so. If pending system reconfiguration requires a reboot, an additional line says so.

## 6.9 HIGH AVAILABILITY OPTION

The High Availability option couples two DT-6X60 modules as an ***active*** and a ***standby***. The ***active*** DT-6X60 runs applications, while the ***standby*** "stands by" and monitors the ***active*** DT-6X60. If the ***active*** DT-6X60 fails or loses power, the ***standby*** will shortly take over the ***active*** role.

In ***standby*** mode, the DT-6X60 has completed system boot, but has not started applications. A ***standby*** DT-6X60 supports a subset of the commands in section 6, plus a small number of commands for support of high availability, documented later in this section. The prompt at the ***standby*** system console contains the word "standby".

Whenever a DT-6X60 with high availability configuration boots, it first enters ***standby*** mode and begins to poll the other DT-6X60 every few seconds across the IP network that joins them. There are three possible outcomes:

- The other DT-6X60 doesn't respond (within a period of approximately 20 seconds), so this ***standby*** becomes ***active***.
- The other DT-6X60 is already ***active***, so this ***standby*** updates its internal time-of-day from the ***active*** and continues to poll.
- The other DT-6X60 is also in ***standby***, so a brief negotiation follows, and one of them becomes ***active***, while the other remains in ***standby***.

The ***standby*** periodically polls the ***active*** and also (optionally) updates its version of system and application configuration from the ***active***. If the ***active*** DT-6X60 fails to respond to probes from the ***standby*** (for approximately 25 seconds), the ***standby*** takes over as ***active*** by starting up the **instances** using its most recent version of system and application configuration. Prior to starting applications, the ***standby*** performs the procedure for accelerated recovery of TCP connections, as described in the **dtproduct** command.

The ***active*** tracks the status of the other DT-6X60, and remembers the most recent poll from the ***standby***. If polls from the ***standby*** are overdue, the ***active*** initiates polling at a low frequency.

The physical proximity of the two DT-6X60's must be near enough on the LAN to provide a reasonably reliable connection between the two. On the other hand, it is wise to avoid having them on the same power line.

If the network connection between the ***active*** and ***standby*** is broken, the network becomes partitioned; the ***standby*** cannot receive responses from the ***active***. Thus the ***standby*** will take over as ***active*** (at least on the portion of the network where it remains connected). When the connection is reestablished, the two ***actives*** soon see each other (because ***actives*** initiate polling when the ***standby*** has not been seen) and respond to this impermissible situation by rebooting. Upon reboot, they negotiate to choose a new ***active*** and ***standby***.

Two new configuration objects are required for the high availability option: **ippublic** and **ipother**. When a DT-6X60 is configured for high availability, the **vfy mod** command shows whether this DT-6X60 is the ***active*** or ***standby***.

*Both members of a duplex configuration must be the same product*: both either are DT-6160's or both are DT-6260's. A DT-6x60 will reject any attempt to use a DT-6061 as the other partner. In addition, a DT-6X60 will reject an attempt to install the DT-6061 platform software.

In a duplex configuration, if an inconsistency is detected between the active and standby (for example, the active is a DT-6061 and the standby is a DT-6160), the standby will wait four and a half minutes, disable the standby console, and reboot 30 seconds later. After rebooting, if the inconsistency is still detected, it repeats the cycle. This prevents the active and standby from synchronizing, thus disabling the ability to switchover from one to the other. The four and one half

minute interval allows the console operator time to investigate what the problem is and take corrective action.

### 6.9.1 MODULE CONFIGURATION FOR HIGH AVAILABILITY – IPPUBLIC, IPOTHER

**Syntax: ippublic <ipaddress>**

**ipother <ipaddress>**

Before configuring a pair of DT-6X60's for high availability, they should each be configured with their own **ipaddr**, and with the appropriate **gateway**, and **submask**. The two DT-6X60's must have the same gateway and must be on the same subnetwork, which is to say the IP addresses of the two DT-6X60s must have the same network ID.

High availability configuration requires choosing a third IP address, **ippublic**, in the same network as the two DT-6X60's. This *public* address is the one to be advertised to all other network elements that might be configured to interoperate with this DT-6X60 pair. High availability is enabled by configuring each DT-6X60 with both **ipother** (the **ipaddr** of the other DT-6X60) and **ippublic**. Each DT-6X60 must then be rebooted to enter high availability mode.

If it is necessary to move the DT-6X60 pair to a different subnetwork, first *remove* the configuration for redundancy, setting both **ippublic** and **ipother** to *none*, then change the **ipaddr**s of both DT-6X60s (see also **gateway** in section 6.4.4), then reconfigure the **ippublic** and **ipother** for the new subnetwork, then reboot.

**Syntax: ippublic none**

**ipother none**

To *remove* the redundancy configuration for both DT-6X60s, set both **ippublic** and **ipother** to *none* then reboot:

### 6.9.2 APPLICATION INSTALLATION AND OPERATIONAL CONFIGURATION

Software installation (**install**) and assignment of software to instances (**app**) are performed as usual on the ***active*** DT-6X60. Application and platform software must be individually registered on both DT-6X60s. The following describes how those operations are managed on the ***standby***.

#### 6.9.2.1 APPLICATION INSTALLATION - STBYUPD

The recommended procedure for installing new application or platform software is to use the **install** command on both the ***active*** and ***standby*** DT-6X60. It doesn't matter which DT-6X60 is updated first. As with the standalone DT-6X60, when performing **install** on the ***active***, the affected instances are automatically restarted.

As an alternative, the ***standby*** may also receive newly installed software from the ***active*** DT-6X60 by using the **stbyupd** command at the ***standby*** console:

**Syntax: stbyupd os | sw**

The **sw** option updates application software. If the ***active*** has been updated with platform software, **stbyupd os** should be performed on the ***standby*** followed by **stbyupd sw**. In order for the **stbyupd sw** or **os** commands to work properly, the current time and date must be set properly using **date** and **timezone** [6.3.6] on the ***active*** controller. If it is not convenient or feasible to check and maintain the current time, then it is recommended to use **install** to keep the ***standby*** software in sync with the ***active***. The release notes for some platform updates *may* countermand use of **stbyupd os**, in which case the normal install procedures should be performed on the ***standby***.

Following installation or the alternative **stbyupd** procedure, the software must be registered on both the ***standby*** and the ***active***.

#### 6.9.2.2 OPERATIONAL CONFIGURATION – STBYUPD CFG

The assignment of application types to instances, i.e. the **app** command, can only be performed on the ***active*** system console. After using **app** to change configuration on the ***active***, the ***standby*** can have its configuration updated by entering **stbyupd cfg** on the ***standby*** console. This will also update the ***standby*** with all current application configuration associated with the **instances** on the ***active*** DT-6X60***.***

### 6.9.3 AUTOMATIC STANDBY CONFIGURATION UPDATE – STBY CFG

The redundant pair of DT-6X60's can be configured to perform a periodic automatic update of configuration from the ***active*** to the ***standby***. This is the most convenient way to propagate configuration changes from the ***active*** system console and from the instances running on the ***active*** into the ***standby*** DT-6X60.

**Syntax: stby cfg SCAN=<minutes> AGE=<minutes> DELAY=<0-20>**

The update period (**SCAN** and **AGE**) is configurable by the user at the ***active*** system console. The **DELAY** value is configured by the user at the ***active*** console for the ***active***, and can also be configured at the ***standby*** console for the ***standby***. However, the standby must be rebooted in order for the **DELAY** value to become effective immediately. Otherwise, the values on the ***standby*** are copied from the ***active*** after the **AGE** period has elapsed.

The **SCAN** period determines how often the ***standby*** polls the ***active***, and the **AGE** value determines how old files must be before they will be automatically copied to the ***standby***. Thus when the ***active*** fails and switches over, any configuration changes that were made in the last "**AGE**" minutes will not be present on the ***standby***. If the values for these parameters are not set, then they default to 5 minutes.

In a duplex DT-6x60 configuration, the **DELAY** parameter adds extra delay in the detection and switchover processes of approximately 6 seconds for each increment of **DELAY**. The default is **DELAY=0**. **DELAY=none** or **DELAY=0** uses the same parameters as previous implementations.

Setting this parameter is only recommended for network connections where an Ethernet switch between the active and standby introduces a long delay before active and standby can communicate with one another. To date, these switches include certain models of Cisco Ethernet switches. The customer must set up the configuration and test it before beginning live production as the delay required varies depending on the model of switch used. It is impossible for Datatek or Tollgrade to try all models that a customer may chose to use. Switchover problems have not been experienced to date when Ethernet switches from other manufacturers are used or when plain hubs are used.

On the ***active*** system console, the **vfy stby** or **stby vfy** command displays the current status of the ***standby*** DT-6X60 and the configured values for **SCAN**, **AGE,** and **DELAY**.

As part of automatic configuration update, when the ***standby*** detects that a new application has been configured, but the software for that application is not resident on the ***standby***, it copies the software from the ***active***, provided that application has been properly installed on the ***active***. This is the *only* case where software is automatically updated on the ***standby***. Otherwise, the procedures given in section 6.9.2.1 above must be performed in order to insure that the version of the application software used for a particular application is the same on the ***standby*** as it is on the ***active*** DT-6X60. Either way, registration of the application on the standby *still* needs to be done manually.

The **SCAN** procedure requires quite a bit of overhead on the ***active*** DT-6X60, so it is recommended to make the **SCAN** period as long as the user's requirements will tolerate (e.g. 60 minutes). The **AGE** delay prevents potentially fault-inducing configuration changes from

propagating to the ***standby***. If the ***active*** survives **AGE** minutes of operations with the new configuration, that configuration is propagated to the ***standby***.

It is not necessary to maintain the current time and date for automatic update to work properly. However, if **date** and **timezone** [6.3.6] are used, an improper setting could cause undue delays in automatic update. In particular, manually setting the date backwards by a large amount while an update is pending could cause an update delay of the same amount.

### 6.9.4 STANDBY LOGS – STBY DLOG, STBY RESET

Two new options have been added to the **stby** command: **dlog** and **reset**.

**Syntax: stby dlog**

**Syntax: stby reset**

Two new logs are available on the **active** system which pertain to the **standby** system:

1. An alarm log showing the major alarms on the standby system
2. A standby activity log

The first log is viewed by entering any of the commands: **vfy stby**, **stby**, or **stby vfy**.

The second log is viewed by entering the command **stby dlog**.

Both logs are cleaned out and restarted by entering the command **stby reset**.

All of the above commands are executed on the ***active*** system.

### 6.9.5 SWITCHOVER

**Syntax: switchover**

The **switchover** command, available only at the ***active*** console, forces a switchover to the ***standby*** DT-6X60. The former ***active*** DT-6X60 then reboots into ***standby*** mode. The **reboot** command at the ***active*** console simply reboots the ***active*** DT-6X60 back to ***active*** mode, while the ***standby*** DT-6X60 allows a little extra time for the ***active*** to complete the **reboot**.

### 6.9.6 COMMANDS NOT AVAILABLE IN *STANDBY* MODE

The following commands are not allowed at the ***standby*** console:

- app
- backup
- banner
- cug
- dns
- dtproduct
- hosts
- remove/restore
- restart
- retrieve/reload
- rstapp
- stby
- snmp
- switchover
- timeout
- timezone

The **help** command at the ***standby*** console shows only the commands that ARE allowed. The **date** command at the ***standby*** console may not be used to change the date. As described above, the ***standby*** receives the current time from the ***active***.

# 7 APPENDIX A: CONSOLE CABLE- SPECIAL WIRING DIAGRAMS

**Figure 5: Console Cable Pin Assigment**

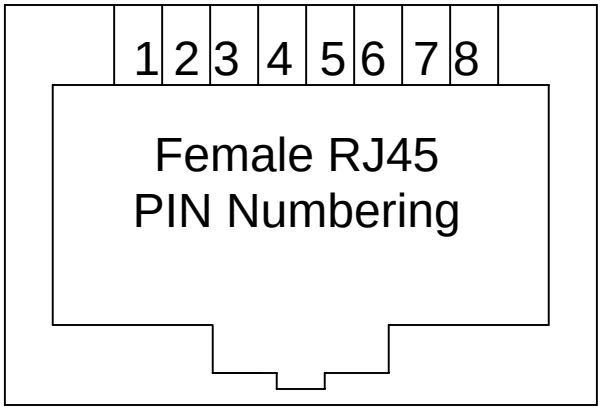
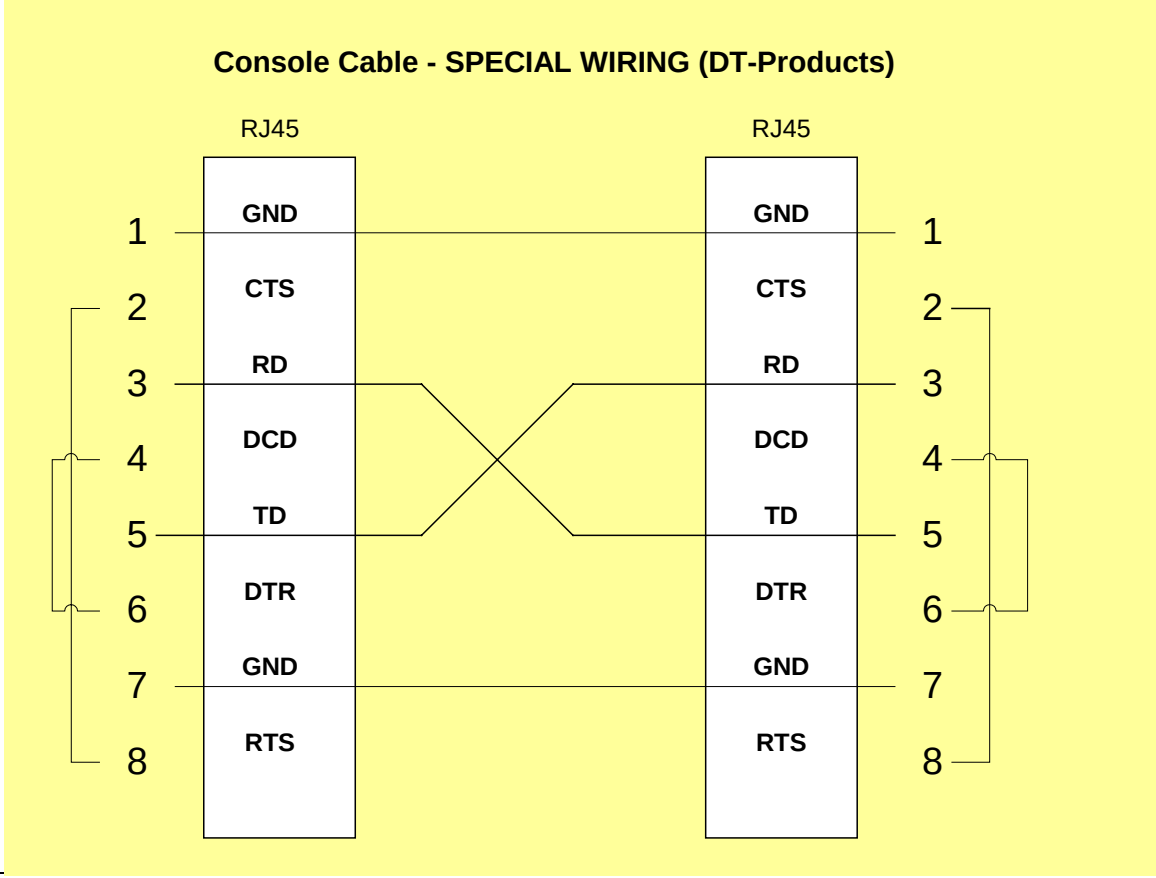



**Figure 6: Special Wiring for Modular Cable**

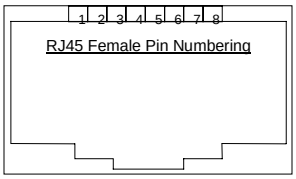


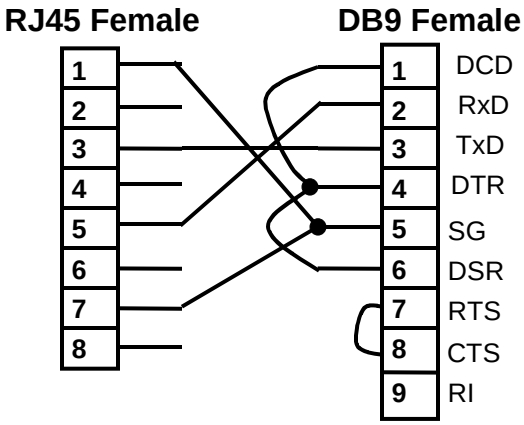
## 7.1 THE DB9 CONSOLE ADAPTER

Some Personal Computers use a 9-pin DB9 interface for serial communications. The terminal emulation programs may require certain lead status. Since console connections are generally implemented as three wire interfaces (i.e. RxD, TxD, and SG); this may pose a problem for the terminal emulation programs.

Below is depicted the wiring of a DB9 adapter which eliminates the problems associated with these terminal emulation programs. It is used with a standard **straight** category 5 RJ45 cable.

# DB9 Async DCE Console Adapter




Note: This cable for use on console ports only.

Use with a straight CAT-5 RJ45 cable.

**Figure 7: 9-Pin Console Adapter Wiring Diagram**

# 8 APPENDIX B: SNMP MIB VARIABLE DATABASE AND TRAPS

The DT-6XXX SNMP V1 agent supports a multitude of SNMP MIB variables accessible by **get** and **set** operations and SNMP ***trap*** operations,

One or more SNMP managers may query the SNMP agent.

| Command | Operational Result |
|---|---|
| Get | Requests the values of one or more Management Information Base (MIB) variables. |
| GetNext | Enables MIB variables to be read sequentially, one variable at a time. |
| Set | Permits one or more MIB values to be updated. |
| GetResponse | Used to respond to a Get, GetNext, or Set. |
| Trap | Indicates the occurrence of a predefined condition. |

**Table 6: SNMP Commands and Action**

## 8.1 SNMP MIB VARIABLE DATABASE

RO = Read Only Variable
R/W = Read Variable / Write Variable
SIV = Storage is Volatile (this applies to enableAuthenTraps

**Table 7: SNMP MIB-II Variables**

| MIB Variable Number | Name | MIB | Console Equivalent | Access | Notes |
|---|---|---|---|---|---|
| 1.3.6.1.2.1.1.1.0 | SysDescr | MIB-II | Banner Message | RO | |
| 1.3.6.1.2.1.1.2.0 | SysObjectID | MIB-II | None | RO | |
| 1.3.6.1.2.1.1.3.0 | SysUpTime | MIB-II | None | RO | |
| 1.3.6.1.2.1.1.4.0 | SysContact | MIB-II | None | R/W | |
| 1.3.6.1.2.1.1.5.0 | SysName | MIB-II | None | R/W | |
| 1.3.6.1.2.1.1.6.0 | SysLocation | MIB-II | None | R/W | |
| 1.3.6.1.2.1.1.7.0 | SysServices | MIB-II | None | RO | |
| 1.3.6.1.2.1.4.1.0 | IpForwarding | MIB-II | None | RO | |
| 1.3.6.1.2.1.4.2.0 | IpDefaultTTL | MIB-II | None | RO | |
| 1.3.6.1.2.1.4.3.0 | IpInReceives | MIB-II | Nbr of Ethernet Pkts Rcvd | RO | |
| 1.3.6.1.2.1.4.4.0 | IpInHdrErrors | MIB-II | Nbr of Packets w/Header Errs | RO | |

| MIB Variable Number | Name | MIB | Console Equivalent | Access | Notes |
|---|---|---|---|---|---|
| 1.3.6.1.2.1.4.5.0 | IpInAddrErrors | MIB-II | Nbr Rx Packets w/Wrong Addr | RO | |
| 1.3.6.1.2.1.4.6.0 | IpForwDatagrams | MIB-II | None | RO | |
| 1.3.6.1.2.1.4.7.0 | IpInUnknownProtos | MIB-II | Nbr of Packets w/Unk Protocol | RO | |
| 1.3.6.1.2.1.4.8.0 | IpInDiscards | MIB-II | Nbr of Packets Disc due to Resource | RO | |
| 1.3.6.1.2.1.4.9.0 | IpInDelivers | MIB-II | Inferred from DMEAS counters | RO | |
| 1.3.6.1.2.1.4.10.0 | IpOutRequests | MIB-II | Nbr of Device Frames Transmitted | RO | |
| 1.3.6.1.2.1.4.11.0 | IpOutDiscards | MIB-II | Nbr of Port frames Disc due to Resource | RO | |
| 1.3.6.1.2.1.4.12.0 | IpOutNoRoutes | MIB-II | None | RO | |
| 1.3.6.1.2.1.4.13.0 | IpReasmTimeout | MIB-II | None | RO | |
| 1.3.6.1.2.1.4.14.0 | IpReasmReqds | MIB-II | None | RO | |
| 1.3.6.1.2.1.4.15.0 | IpReasmOKs | MIB-II | None | RO | |
| 1.3.6.1.2.1.4.16.0 | IpReasmFails | MIB-II | None | RO | |
| 1.3.6.1.2.1.4.17.0 | IpFragOKs | MIB-II | None | RO | |
| 1.3.6.1.2.1.4.18.0 | IpFragFails | MIB-II | None | RO | |
| 1.3.6.1.2.1.4.19.0 | IpFragCreates | MIB-II | None | RO | |
| 1.3.6.1.2.1.4.21.0 | IpRoutingDiscards | MIB-II | None | RO | |
| 1.3.6.1.2.1.5.1.0 | IcmpInMsgs | MIB-II | None | RO | |
| 1.3.6.1.2.1.5.2.0 | IcmpInErrors | MIB-II | ICMP Errors | RO | |
| 1.3.6.1.2.1.5.3.0 | IcmpInDestUnreach | MIB-II | None | RO | |
| 1.3.6.1.2.1.5.8.0 | IcmpInEchos | MIB-II | Nbr of Pings | RO | |
| 1.3.6.1.2.1.5.9.0 | IcmpInEchoReps | MIB-II | None | RO | |
| 1.3.6.1.2.1.6.1.0 | TcpRtoAlgorithm | MIB-II | None | RO | |
| 1.3.6.1.2.1.6.2.0 | TcpRtoMin | MIB-II | None | RO | |
| 1.3.6.1.2.1.6.3.0 | TcpRtoMax | MIB-II | None | RO | |
| 1.3.6.1.2.1.6.4.0 | TcpMaxConn | MIB-II | None | RO | |
| 1.3.6.1.2.1.6.5.0 | TcpActiveOpens | MIB-II | None | RO | |
| 1.3.6.1.2.1.6.6.0 | TcpPassiveOpens | MIB-II | None | RO | |
| 1.3.6.1.2.1.6.7.0 | TcpAttemptFails | MIB-II | None | RO | |
| 1.3.6.1.2.1.6.8.0 | TcpEstabResets | MIB-II | None | RO | |

| MIB Variable Number | Name | MIB | Console Equivalent | Access | Notes |
|---|---|---|---|---|---|
| 1.3.6.1.2.1.6.9.0 | TcpCurrEstab | MIB-II | None | RO | |
| 1.3.6.1.2.1.6.10.0 | TcpInSegs | MIB-II | None | RO | |
| 1.3.6.1.2.1.6.11.0 | TcpOutSegs | MIB-II | None | RO | |
| 1.3.6.1.2.1.6.12.0 | TcpRetransSegs | MIB-II | None | RO | |
| 1.3.6.1.2.1.6.13.X | TcpConnTable Entries | MIB-II | None | RO | |
| 1.3.6.1.2.1.6.14.0 | TcpInErrs | MIB-II | None | RO | |
| 1.3.6.1.2.1.6.15.0 | TcpOutRsts | MIB-II | None | RO | |
| 1.3.6.1.2.1.7.1.0 | UdpInDatagrams | MIB-II | Derived from other Counts. | RO | |
| 1.3.6.1.2.1.7.2.0 | UdpNoPorts | MIB-II | Non-Peer and Spurious UDP errors | RO | |
| 1.3.6.1.2.1.7.3.0 | UdpInErrors | MIB-II | Frame Errors | RO | |
| 1.3.6.1.2.1.7.4.0 | UdpOutDatagrams | MIB-II | Frames Sent, Keep Alive Messages sent, etc. | RO | |
| 1.3.6.1.2.1.7.5.X | udpEntry Table | MIB-II | None | RO | |
| 1.3.6.1.2.1.11.1.0 | SnmpInPkts | MIB-II | None | RO | |
| 1.3.6.1.2.1.11.3.0 | SnmpInBadVersions | MIB-II | None | RO | |
| 1.3.6.1.2.1.11.4.0 | SnmpInBadCommunityNames | MIB-II | None | RO | |
| 1.3.6.1.2.1.11.5.0 | SnmpInBadCommunityUses | MIB-II | None | RO | |
| 1.3.6.1.2.1.11.6.0 | SnmpInASNParseErrs | MIB-II | None | RO | |
| 1.3.6.1.2.1.11.30.0 | SnmpEnableAuthenTraps | MIB-II | None | R/W | |
| 1.3.6.1.2.1.11.31.0 | SnmpSilentDrops | MIB-II | None | RO | |
| 1.3.6.1.2.1.11.32.0 | SnmpProxyDrops | MIB-II | None | RO | |

The SNMP object ID for the product code is the following for each of the DT-6XXX products:

- DT-6061 - 1.3.6.1.4.1.3791.3.**7**
- DT-6160 - 1.3.6.1.4.1.3791.3.**13**
- DT-6260 - 1.3.6.1.4.1.3791.3.**14**

## 8.2 SUPPORTED TRAPS

| Alarm Text | Severity | Trap Type | Notes |
|---|---|---|---|
| None | N/A | WarmStart | Generated when the unit reboots or restarts |
| None | N/A | AuthFail | SNMP Authorization Failure |

**Table 8: Supported SNMP Traps**

# 9 APPENDIX C: TCP/UDP PORT NUMBERS

The DT-6X60 uses the following TCP and UDP ports. These ports cannot be changed by configuring them.

| Protocol | Port Number | Purpose |
|---|---|---|
| UDP | 161 | Used by SNMP managers to set MIB values or get MIB data from the DT-6X60 |
| UDP | 162 | Used by the DT-6X60 SNMP agent for sending Traps to the designated SNMP manager |
| TCP | 1023 | The telnet console port for the platform. Duplicates the input and output of the hard-wired serial console. |
| TCP | 1024-5000 | Ports dynamically assigned by the DT-6X60 for outgoing calls. Do NOT use or assign these ports. |
| UDP | 9998 | Active/Standby communication port |
| UDP | 9999 | Dtproduct - obsolete |
| TCP | 10001-10048 | The telnet console port for the application installed in instances 1 through 30 in a DT-6160 or 1 through 48 in a DT-6260. |
| TCP | 30000-39599 | Ports assigned in configuring various DT-6XXX applications |

**Table 9: TCP/UDP Port Numbers Used**

# 10 APPENDIX D: THE DISPLAY MEASUREMENTS (DM) REPORT

The DT-6X60 platform maintains measurements of network activity as an aggregate of all the application instances. The measurements are grouped into four categories: IP, TCP, UDP, and ICMP. Many of these measurements are related to variables included in MIB II - Management Information Base for Network Management of TCP/IP-based Internets (RFC1213).

In the following report samples, the identifiers indicated in red have been added to reference individual measurements. Information is then provided (in some cases from RFC1213) to describe each measurement. Measurements that do not have identifiers (mainly in the TCP section) are those that would be helpful only to developers who are diagnosing problems, but would not be useful to end users on their own.

Please note that the measurements shown in the following report samples may not be representative of any particular customer's installation; i.e., the presence of 0's (or non-0's) is not necessarily an indication of what should be expected.

## 10.1 IP - DM IP

```
<DT-6X60> dm ip
ip:
IP 1  2488798 total packets received
IP 2  0 bad header checksums
IP 2  0 with size smaller than minimum
IP 2  0 with data size < data length
IP 2  0 with header length < data size
IP 2  0 with data length < header length
IP 2  0 with bad options
IP 2  0 with incorrect version number
IP 3  0 fragments received
IP 4  0 fragments dropped (dup or out of space)
IP 4  0 fragments dropped after timeout
IP 5  0 packets reassembled ok
IP 6  2414429 packets for this host
IP 7  74369 packets for unknown/unsupported protocol
IP 8  0 packets forwarded
IP 9  0 packets not forwardable
      0 redirects sent
IP 10 2186773 packets sent from this host
      0 packets sent with fabricated ip header
IP 11 0 output packets dropped due to no bufs, etc.
IP 12 0 output packets discarded due to no route
IP 13 0 output datagrams fragmented
IP 14 0 fragments created
```

**IP 15 0 datagrams that can't be fragmented**

**Measurement descriptions:**

IP 1: The total number of input datagrams received from interfaces, including those received in error.

IP 2: The number of input datagrams discarded due to errors in their IP headers, broken down by bad checksums, version number mismatch, other format errors, time-to-live exceeded, errors discovered in processing their IP options, etc.

IP 3: The number of IP fragments received which needed to be reassembled at this entity.

IP 4: The number of failures detected by the IP re-assembly algorithm (for whatever reason: timed out, errors, etc).

IP 5: The number of IP datagrams successfully re-assembled.

IP 6: The total number of input datagrams successfully delivered to IP user-protocols (including ICMP).

IP 7: The number of locally-addressed datagrams received successfully but discarded because of an unknown or unsupported protocol.

IP 8: The number of input datagrams for which this entity was not their final IP destination, as a result of which an attempt was made to find a route to forward them to that final destination. In entities that do not act as IP Gateways, this counter will include only those packets that were Source-Routed via this entity, and the Source-Route option processing was successful.

IP 9: The number of input datagrams discarded because the IP address in their IP header's destination field was not a valid address to be received at this entity. This count includes invalid addresses (e.g., 0.0.0.0) and addresses of unsupported Classes (e.g., Class E). For entities that are not IP Gateways and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address.

IP 10: The total number of IP datagrams that local IP user-protocols (including ICMP) supplied to IP in requests for transmission. Note that this counter does not include any datagrams counted in IP 8.

IP 11: The number of output IP datagrams for which no problem was encountered to prevent their transmission to their destination, but which were discarded (e.g., for lack of buffer space). Note that this counter would include datagrams counted in IP 8 if any such packets met this (discretionary) discard criterion.

IP 12: The number of IP datagrams discarded because no route could be found to transmit them to their destination. Note that this counter includes any packets counted in IP 8 which meet this `no-route' criterion. Note that this includes any datagrams that a host cannot route because all of its default gateways are down.

IP 13: The number of IP datagrams that have been successfully fragmented at this entity.

IP 14: The number of IP datagram fragments that have been generated as a result of fragmentation at this entity.

IP 15: The number of IP datagrams that have been discarded because they needed to be fragmented at this entity but could not be, e.g., because their Don't Fragment flag was set.

## 10.2 TCP – DM TCP

```
<DT-6X60> dm tcp
tcp:
TCP 1 1215000 packets sent
      74247 data packets (963479 bytes)
TCP 2 46 data packets (650 bytes) retransmitted
      0 resends initiated by MTU discovery
      1021108 ack-only packets (905646 delayed)
      0 URG only packets
      0 window probe packets
      68 rcv window update packets
      119724 control packets
TCP 3 2067762 packets received
      114483 acks (for 983715 bytes)
      81356 duplicate acks
      0 acks for unsent data
      1656659 packets (46725796 bytes) received in-sequence
      68313 completely duplicate packets (12111 bytes)
      0 old duplicate packets
      0 packets with some dup. data (0 bytes duped)
      7510 out-of-order packets (443 bytes)
      0 packets (0 bytes) of data after window
      0 window probes
      172 xmt window update packets
      0 packets received after close
      0 discarded for bad checksums
      0 discarded for bad header offset fields
      0 discarded because packet too short
TCP 4 99112 connection requests
TCP 5 7974 connection accepts
TCP 6 3 bad connection attempts
      50 listen queue overflows
TCP 7 20624 connections established (including accepts)
TCP 8 113169 connections closed (including 450 drops)
      51 connections updated cached RTT on close
      51 connections updated cached RTT variance on close
      8 connections updated cached ssthresh on close
TCP 9       86448 embryonic connections dropped
TCP 10      114403 segments updated rtt (of 200957 attempts)
TCP 11      19433 retransmit timeouts
TCP 12      2 connections dropped by rexmit timeout
```

```
TCP 13      0 persist timeouts
TCP 14      0 connections dropped by persist timeout
TCP 15      10223 keepalive timeouts
            0 keepalive probes sent
TCP 16      9630 connections dropped by keepalive
            22427 correct ACK header predictions
            1616588 correct data packet header predictions
```

**Measurement descriptions:**

TCP 1: The total number of segments sent, including those on current connections but excluding those containing only retransmitted octets.

TCP 2: The total number of segments retransmitted – that is, the number of TCP segments transmitted containing one or more previously transmitted octets.

TCP 3: The total number of segments received, including those received in error. This count includes segments received on currently established connections.

TCP 4: The number of times TCP connections have made a direct transition to the SYN-SENT state from the CLOSED state.

TCP 5: The number of times TCP connections have made a direct transition to the SYN-RCVD state from the LISTEN state.

TCP 6: The number of times TCP connections have made a direct transition to the CLOSED state from either the SYN-SENT state or the SYN-RCVD state, plus the number of times TCP connections have made a direct transition to the LISTEN state from the SYN-RCVD state.

TCP 7: The number of TCP connections reaching the ESTABLISHED state.

TCP 8: The number of TCP connections or connection attempts that have been closed. Drops are closes initiated at the local end of the connection.

TCP 9: The number of connections closed that never reached ESTABLISHED state.

TCP 10: The count of window size updates based on round trip estimate.

TCP 11: The number of time expirations while awaiting an expected ACK.

TCP 12: The number of connections dropped because of the above timeout

TCP 13: The number of time expirations while waiting for window to open

TCP 14: The number of connections dropped because of the above timeout

TCP 15: The number of keep-alive timer expirations on idle connections

TCP 16: The number of connections dropped because of the above timeout

## 10.3 UDP – DM UDP

```
<DT-6X60> dm udp
udp:
       834716 datagrams received
UDP 1  0 with incomplete header
UDP 1  0 with bad data length field
UDP 1  0 with bad checksum
UDP 2   dropped due to no socket
UDP 2  189454 broadcast/multicast datagrams dropped due to no socket
UDP 1  0 dropped due to full socket buffers
       645262 not for hashed pcb
UDP 3  645261 delivered
UDP 4  570930 datagrams output
```

**Measurement descriptions:**

UDP 1: The number of received UDP datagrams that could not be delivered, broken down by reasons other than the lack of an application at the destination port.

UDP 2: The number of received UDP datagrams for which there was no application at the destination port.

UDP 3: The total number of UDP datagrams delivered to UDP users.

UDP 4: The total number of UDP datagrams sent from this entity.

## 10.4 ICMP – DM ICMP

Note - within the output and input histograms embedded in this report, only parameters with non-zero values will be printed.

```
<DT-6X60> dm icmp
icmp:
ICMP 1      1 call to icmp_error
            0 errors not generated 'cuz old message was icmp
            Output histogram:
ICMP 2      echo reply: 8
ICMP 3      destination unreachable: 1
ICMP 4      source quench: 1
ICMP 5      routing redirect: 2
ICMP 6      echo: 3
ICMP 7      time exceeded: 1
ICMP 8      parameter problem: 1
ICMP 9      time stamp: 2
ICMP 10     time stamp reply: 1
ICMP 11     address mask request: 1
ICMP 12     address mask reply: 1
            0 messages with bad code fields
            0 messages < minimum length
            0 bad checksums
            0 messages with bad length
            Input histogram:
ICMP 13     echo reply: 4
ICMP 14     destination unreachable: 74369
ICMP 15     source quench: 1
ICMP 16     routing redirect: 1
ICMP 17     echo: 8
ICMP 18     time exceeded: 1
ICMP 19     parameter problem: 1
ICMP 20     time stamp: 2
ICMP 21     time stamp reply: 2
ICMP 22     address mask request: 1
ICMP 23     address mask reply: 1
            8 message responses generated
```

**Measurement descriptions:**

ICMP 1: The number of ICMP messages that the entity received but determined as having ICMP-specific errors (bad ICMP checksums, bad length, etc.).

ICMP 2: The number of ICMP Echo Reply messages sent.

ICMP 3: The number of ICMP Destination Unreachable messages sent.

ICMP 4: The number of ICMP Source Quench messages sent.

ICMP 5: The number of ICMP Redirect messages sent.

ICMP 6: The number of ICMP Echo (request) messages sent.

ICMP 7: The number of ICMP Time Exceeded messages sent.

ICMP 8: The number of ICMP Parameter Problem messages sent.

ICMP 9: The number of ICMP Timestamp (request) messages sent.

ICMP 10: The number of ICMP Timestamp Reply messages sent.

ICMP 11: The number of ICMP Address Mask Request messages sent.

ICMP 12: The number of ICMP Address Mask Reply messages sent.

ICMP 13: The number of ICMP Echo Reply messages received.

ICMP 14: The number of ICMP Destination Unreachable messages received.

ICMP 15: The number of ICMP Source Quench messages received.

ICMP 16: The number of ICMP Redirect messages received.

ICMP 17: The number of ICMP Echo (request) messages received.

ICMP 18: The number of ICMP Time Exceeded messages received.

ICMP 19: The number of ICMP Parameter Problem messages received.

ICMP 20: The number of ICMP Timestamp (request) messages received.

ICMP 21: The number of ICMP Timestamp Reply messages received.

ICMP 22: The number of ICMP Address Mask Request messages received.

ICMP 23: The number of ICMP Address Mask Reply messages received.

## 10.5 ETH – DM ETH

```
<tuna: DT-6160> dm eth
Name Mtu   Network       Address              Ipkts Ierrs    Opkts Oerrs  Coll Drop
LCL  16384 <Link>                               2     0        2     0     0   0
LCL  16384 127           127.0.0.1              2     0        2     0     0   0
SNP  1500  <Link>                               0     0        0     0     0   0
ETH  1500  <Link>00.60.0a.0b.3a.7b         8824303     0   329020     4     0   0
ETH  1500  192.168.8     192.168.8.199      8824303     0   329020     4     0   0
ETH  1500  192.168.8.48/ 192.168.8.48       8824303     0   329020     4     0   0
<tuna: DT-6160>
```

# 11 APPENDIX E: BRIEF DESCRIPTIONS OF DT-6XXX APPLICATIONS

## 11.1 IP-BHI

The IP-BHI (BiSync Host Interface) application allows a legacy BiSync host to connect to an IP network (using a DT-4000). Each instance of the application emulates one BiSync line with up to 32 cluster controllers and up to 32 logical devices per cluster controller. A DT-6X60 can support up to 30 or 48 instances of the IP-BHI application; so one DT-6X60 embedded network processor can support 30 or 48 host lines.

This application can also be used to replace the functionality of SYNC8 module used in BHIM mode in a BNS/Datakit® network.

## 11.2 TN3270

The TN3270 application will allow a PC that is connected to an IP network and has a 3270 client application installed within it to access a BiSync host via either the BNS/Datakit Sync8 module in BHIM mode or the IP-BHI application described above.

This application can also be used to replace the functionality of the Datakit TN3270 DKAP application.

## 11.3 IP-B2APRT

The BiSync to ASCII printer application, IP-B2APRT, allows a BiSync host to print to an ASCII printer located on an IP network. This application is usually used in conjunction with the TN3270, IP-BHI, and IP-SPOOL applications.

This application can also be used to replace the functionality of the Datakit A2B DKAP application.

## 11.4 IP-E2A

The IP-E2A application replaces the legacy E2A module function in a Datakit network. It provides the digital bridge function, thus eliminating the need for the high maintenance and difficult-to-fix digital networks used prevalently with E-telemetry. It can be used in an IP network to provide a gateway for E2 and E2A network elements to OS host applications.

## 11.5 IP-FANOUT

The IP-FANOUT application allows up to 504 IP-GATES (either standalone or those which are an embedded function of a DT-4000) to communicate over a WAN network.

## 11.6 IP-LTCN

The IP-LTCN application is a migration solution for all variants of the Loop Test Communications Environments. It is used in conjunction with an Internet Protocol conversion of the Tollgrade

® Datakit is a registered trademark of Lucent Technologies, Inc, licensed to Datatek Applications, Inc., a company independent of Lucent Technologies, Inc.

LoopCare® product. The LoopCare product is the evolution of the Lucent Technologies MLT operations system.

The IP-LTCN can replace a DCN in its entirety. This eliminates a maintenance risk since the DCN is manufacturer discontinued, with a consequential shortage of spare parts. A side benefit is that the IP-LTCN will free up the 120 square feet of conditioned floor space taken up by the DCN.

The IP-LTCN supports an enhanced TCP/IP interface to the LoopCare host. This allows connectivity with the LoopCare hosts using an IP infrastructure. The new LoopCare hosts do not have either a BX.25 interface to communicate with a DCN, or a fiber interface to communicate with a BNS/Datakit node. Instead, the LoopCare hosts have implemented a direct

TCP/IP (with RFC 854+885+1123 encapsulation) interface to the IP-LTCN application.

The IP-LTCN application relies on the DT-6X60 redundancy infrastructure for its reliability. The DT-6X60 infrastructure provides 100% reliability through a 1+1 spare arrangement. The IP-LTCN implements both the “A” and “B” cabinets of the DCN, and all interface paths of the LCN. Consequently, the IP-LTCN is the most reliable solution possible for the loop test environment.

## 11.7 X25PAD

The X25PAD Application eliminates the need, complexity, and expense of specialized X.25 equipment in an IP network. The X25PAD Application allows an X.25/BX.25 device, such as a network element’s console, to be connected to a synchronous port anywhere in the IP network. Examples are a port on a DT-4XXX or DT-2020 connected SAM, or an endpoint such as a SAM port in a BNS/Datakit network that connects to an IP network through a UMI module. X25PAD Application connections to virtual circuits on an X.25/BX.25 port are provided with a telnet TCP/IP connection and support both X.3 PAD and Pass-Through functionality on a per virtual circuit basis.

This application can also be used to replace the functionality of the Datakit X25 Pass-Through DKAP application.

## 11.8 IP-SLM

The IP-SLM application performs a software emulation of the BNS BX.25 interface (also known as the Synchronous Line Module (SLM)). The IP-SLM application allows low cost and high-density access points to terminate BX.25 interfaces common to Network Elements. The result is significant cost savings, and administrative simplification. The IP-SLM is also a migration vehicle, which enables the reduction or elimination of proprietary network components for the Network Element support functionality.

Recent changes in requirements by Telcordia Technologies for the volume of information collected from network elements have generated the need for higher speed BX.25 links. The most cost effective way to meet this need is with the IP-SLM application. Synchronous line speeds as high as 56 Kbps are supported.

® LoopCare is a registered trademark of Tollgrade, Inc.

## 11.9 IP-SPOOL

Many existing networking equipment consoles have the need for a dedicated print device. Similarly, legacy hosts and their applications typically assume a dedicated printer of which their use is exclusive. Many of these print devices are under-utilized, but require considerable periodic maintenance. Finally, the physical location of these printers may not be convenient, due to requirements implied by their legacy interfaces.

The IP-SPOOL application provides print spooling per RFC1179 to a shared print resource. It provides the ability to route print output to a shared printer anywhere in the IP network. It reduces the overall cost associated with legacy interfaces by eliminating underutilized, dedicated equipment and its maintenance.

One DT-6X60, running the IP-SPOOL application, supports up to 30/48 units that can share a common physical printer. The actual number is dependent on the utilization of the previously dedicated printers and the print speed of the shared printer. More than one DT-6X60 could share the same physical printer also.

## 11.10 IP-VCON

There is a need to deal with the multitude of *console* connections in modern networks. These consoles may be physical consoles, or logical connections via (B)X.25 logical channel connections, Telnet connections, etc. There is a need to monitor those consoles autonomously and unobtrusively.

The IP-VCON application takes over the mundane task of monitoring a large and various set of consoles autonomously, collecting the most important console messages, and intervening automatically when necessary according to user-defined scripts. When an administrator wishes to access any device console directly, the IP-VCON application provides the necessary connectivity without interrupting the monitoring function.

The IP-VCON application attaches via a TCP connection to any *console*, whether network based or physical. The protocol used by the console is unimportant. The application will monitor that console, take action on exceptions as needed, and provide a single means to access every console on and off the network. The application is eternally vigilant and will notify when a *console* indicates a problem situation. It can even determine an outage of equipment and cause appropriate actions to be executed.

The IP-VCON application can monitor and administer up to 768 consoles.

Via the application, each console may be monitored and administered by multiple human network administrators. Sixty-four administrators may be defined, and sixteen of these can be simultaneously accessing the application. Each administrator has its own login and password for access to the application. Each administrator has his its own list of consoles to which he/she is permitted access. As stated above, even if no administrators are logged onto the application, the application keeps track of what is happening for later use by an administrator and may take appropriate action in the interim.

## 11.11 MULTIMATE

There has always been a need to share the precious resources of certain network elements. With some protocols, this was accomplished by using a port-sharing device and a spider network of cabling. Other more complicated protocols required an external PAD and even more cabling. Although the expense was high, there was no other way to share a resource.

The MultiMate application was designed to eliminate the wasteful expense of external PADs and port-sharing devices. In addition, strategies for redundancy and disaster recovery become available through the judicious use of MultiMate.

## 11.12 ONSITE

The ONSITE application for the DT-6X60 Network Processor provides a connection and monitoring service for DT-9001 devices. This application translates DT-9001 temperature reports or contact state changes into text-based messages to be delivered to IP-connected host machines.

Multiple DT-9001 devices with multiple contacts can be monitored, and multiple hosts may receive messages as result of a single event from a DT-9001. Hosts, whose connections are configured and in service will receive text messages, subject to the condition of their TCP connection.

# 12 APPENDIX F: DT-6X60 SPECIFICATIONS

**To maintain compliance with the above-mentioned EMC standards, shielded cables must be used on all *DT-6X60* interface connections, and the shields must make an electrical connection to the *DT-6X60*'s grounding system.**

## 12.1 CONSOLE PORT

A standard RS-232C interface that uses binary data interchange between DTE and DCE. This interface uses an RJ45 connector and operates at 9600 bits per second (bps), 8 bits per character, no parity, and one stop bit.

## 12.2 10/100 LAN PORT

The 8-pin LAN modular connector is used to interface to a 10/100 Mbps baseband CSMA/CD local area network.

## 12.3 PHYSICAL DIMENSIONS

L= 16.9 x W=8.77 x D=1.72

## 12.4 ENVIRONMENTAL OPERATING RANGE

| | |
|---|---|
| Operating Temperature: | 5° to 40°C (41°F to 104°F) per GR-63-CORE. |
| Operating Humidity: | 5% to 85% |
| Altitude: | From 60 m (197 ft.) below sea level to 4000 m (13122 ft) |

**Table 10: Environmental Operating Ranges**

## 12.5 REGULATORY INFORMATION

| | |
|---|---|
| Safety: | UL listed U.S. and Canada |
| EMC: | FCC Part 15B Class A, ICES-003 Class A |
| NEBS: | Level 3 Compliant – designed and built to applicable GR-1089-CORE and GR-63-CORE requirements |

**Table 11: Regulatory Information**

## 12.6 POWER REQUIREMENTS

| Voltages | Current Draw |
|---|---|
| **Power Input Requirements** | |
| DT-6X60 Operating Voltage | 5V @ 1920 mA Nominal |
| 115 V AC to 24 V DC power supply | 24V @ 400 mA Nominal<br>24V @ 820 mA Maximum |
| -48 V DC power source | 48V @ 200 mA Nominal<br>48V @ 380 mA Maximum |
| POE (-48V DC) | Same as -48 V DC power |
| **Power Output Requirements** | |
| 5 V Output Connection | 5 V DC @ 2750 mA Maximum |

**Table 12: Power Requirements**

# 13 HARDWARE WARRANTY

The warranty period for hardware shall be ninety (90) days from the date of shipment from Datatek Applications, Inc. Replacements and repairs are guaranteed for the longer of the remaining original warranty period or 30 days.

# 14 END-USER LICENSE AGREEMENT FOR SOFTWARE

This License Agreement ("License") is a legal contract between you and the manufacturer ("Manufacturer") of the system ("HARDWARE") with which you acquired software product(s) identified above ("SOFTWARE"). The SOFTWARE may include printed materials that accompany the SOFTWARE. Any software provided along with the SOFTWARE that is associated with a separate end-user license agreement is licensed to you under the terms of that license agreement. By installing, copying, downloading, accessing or otherwise using the SOFTWARE, you agree to be bound by the terms of this LICENSE. If you do not agree to the terms of this LICENSE, Manufacturer is unwilling to license the SOFTWARE to you. In such event, you may not use or copy the SOFTWARE, and you should promptly contact Manufacturer for instructions on return of the unused product(s) for a refund.

## 14.1 SOFTWARE LICENSE

You may only install and use one copy of the SOFTWARE on the HARDWARE (unless otherwise licensed by Manufacturer). The SOFTWARE may not be installed, accessed, displayed, run, shared or used concurrently on or from different computers, including a workstation, terminal or other digital electronic device (“Devices”). Notwithstanding the foregoing and except as otherwise provided below, any number of Devices may access or otherwise utilize the services of the SOFTWARE. You may not reverse engineer, decompile, or disassemble the SOFTWARE, except and only to the extent that such activity is expressly permitted by applicable law notwithstanding this limitation. The SOFTWARE is licensed as a single product. Its component parts may not be separated for use on more than one HARDWARE. The SOFTWARE is licensed with the HARDWARE as a single integrated product. The SOFTWARE may only be used with the HARDWARE as set forth in this LICENSE. You may not rent, lease or lend the SOFTWARE in any manner. You may permanently transfer all of your rights under this LICENSE only as part of a permanent sale or transfer of the HARDWARE, provided you retain no copies, you transfer all of the SOFTWARE (including all component parts, the media and printed materials, any upgrades, this LICENSE and, if applicable, the Certificate(s) of Authenticity), and the recipient agrees to the terms of this LICENSE. If the SOFTWARE is an upgrade, any transfer must also include all prior versions of the SOFTWARE. Without prejudice to any other rights, Manufacturer may terminate this LICENSE if you fail to comply with the terms and conditions of this LICENSE. In such event, you must destroy all copies of the SOFTWARE and all of its component parts.

## 14.2 INTELLECTUAL PROPERTY RIGHTS

The SOFTWARE is licensed, not sold to you. The SOFTWARE is protected by copyright laws and international copyright treaties, as well as other intellectual property laws and treaties. You may not copy the printed materials accompanying the SOFTWARE. All title and intellectual property rights in and to the content which may be accessed through use of the SOFTWARE is the property of the respective content owner and may be protected by applicable copyright or other intellectual property laws and treaties. This LICENSE grants you no rights to use such content. All rights not expressly granted under this LICENSE are reserved Manufacturer and its licensors (if any).

## 14.3 SOFTWARE SUPPORT

SOFTWARE support is not provided by Manufacturer, or its affiliates or subsidiaries separate from the HARDWARE. For SOFTWARE support, please contact your supplier of the HARDWARE. SOFTWARE support is limited to the warranty period stated below unless either a separate contract has been consummated between you and the manufacturer or the manufacturer has agreed in writing at the time of purchase by you of the software to an extension of the warranty. Should you have any questions concerning this LICENSE, or if you desire to contact Manufacturer for any other reason, please refer to the address provided in the documentation for the HARDWARE.

## 14.4 EXPORT RESTRICTIONS

You agree that you will not export or re-export the SOFTWARE to any country, person, or entity subject to U.S. export restrictions. You specifically agree not to export or re-export the SOFTWARE: (i) to any country to which the U.S. has embargoed or restricted the export of goods or services, which as of March 1998 include, but are not necessarily limited to Cuba, Iran, Iraq, Libya, North Korea, Sudan and Syria, or to any national of any such country, wherever located, who intends to transmit or transport the products back to such country; (ii) to any person or entity who you know or have reason to know will utilize the SOFTWARE or portion thereof in the design, development or production of nuclear, chemical or biological weapons; or (iii) to any person or entity who has been prohibited from participating in U.S. export transactions by any federal agency of the U.S. government.

## 14.5 LIMITED WARRANTY

Manufacturer warrants that (a) the SOFTWARE will perform substantially in accordance with the accompanying written materials for a period of ninety (90) days from the date of shipment from Datatek Applications, Inc. Software support is limited to the hours of 9 AM to 5 PM ET Monday through Friday excluding Datatek-observed holidays. Other coverage and extended warranty may be purchased at additional cost. Any implied warranties on the SOFTWARE are limited to ninety (90) days. Some states/jurisdictions do not allow limitations on duration of an implied warranty, so the above limitation may not apply to you.

Manufacturer's and its suppliers' entire liability and your exclusive remedy shall be, at Manufacturer's option, either (a) return of the price paid, or (b) repair or replacement of the SOFTWARE that does not meet this Limited Warranty and which is returned to Manufacturer with a copy of your receipt. This Limited Warranty is void if failure of the SOFTWARE has resulted from accident, abuse, or misapplication. Any replacement SOFTWARE will be warranted for the remainder of the original warranty period or thirty (30) days, whichever is longer.

## 14.6 NO OTHER WARRANTIES

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, MANUFACTURER AND ITS SUPPLIERS DISCLAIM ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT, WITH REGARD TO THE SOFTWARE AND THE ACCOMPANYING WRITTEN MATERIALS. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY HAVE OTHERS, WHICH VARY FROM STATE/JURISDICTION TO STATE/JURISDICTION.

## 14.7 SPECIAL PROVISIONS

The SOFTWARE and documentation are provided with RESTRICTED RIGHTS. Use, duplication, or disclosure by the United States Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and HARDWARE Software clause at

DFARS 252.227-7013 or subparagraphs (c)(1) and (2) of the Commercial HARDWARE Software-Restricted Rights at 48 CFR 52.227-19, as applicable. Manufacturer is Datatek Applications, Inc., 379 Campus Drive, Suite 100, Somerset, NJ 08873.

If you acquired the SOFTWARE in the United States of America, this Software License are governed by the laws of the State of New Jersey, excluding its choice of laws provisions. If you acquired the SOFTWARE outside the United States of America, local law may apply. This LICENSE constitutes the entire understanding and agreement between you and the Manufacturer in relation to the SOFTWARE and supercedes any and all prior or other communications, statements, documents, agreements or other information between the parties with respect to the subject matter hereof.

# 15 LIMITATION OF LIABILITY

**To the maximum extent permitted by applicable law, in no event shall Manufacturer or its suppliers be liable for any damages whatsoever (including without limitation, special, incidental, consequential, or indirect damages for personal injury, loss of business profits, business interruption, loss of business information, or any other pecuniary loss) arising out of the use of or inability to use this product, even if Manufacturer has been advised of the possibility of such damages.** In any case, Manufacturer's and its suppliers' entire liability under any provision of this License shall be limited to the amount actually paid by you for the SOFTWARE and/or the HARDWARE. Because some states/jurisdictions do not allow the exclusion or limitation of liability for consequential or incidental damages, the above limitation may not apply to you.

©Copyright 2004, 2006 TeleComp Research and Development Corp.

©Copyright 2004, 2007 Datatek Applications, Inc.

All Rights Reserved

Printed in USA